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Editorials.

THE BOARD OF AGRICULTURE.

NUMEROUS caustic criticisims have from time to time been made upon the methods adopted by the Board of Agriculture as to the manner in which it has treated the Veterinary Staff and the way in which it has attempted to eradicate animal diseases; and, although, undoubtedly, some of the criticisms have been deserved, it must not be forgotten that all Government bodies are necessarily cautious, or even slow, in making changes; and perhaps, too, we, as a profession, have not altogether been blameless in not sufficiently urging our superior claims to give expert opinion on all questions concerning animal diseases. The social and intellectual advantages obtained to-day by the modern veterinary surgeon would hardly have been dreamt of by those of our profession a generation ago, and we must, if we wish to progress, continually be urging our claims, in our own particular sphere, to the front. The new arrangement of the Permanent Official Staff of the Board of Agriculture will be welcomed on all sides, and the fact that those who desire to be appointed on the permanent staff, and so become eligible for a pension, must give practical proof of up-to-date knowledge by submitting themselves to an examination in animal hygiene (including tropical medicine), as well as in the provisions of the Diseases of Animals Acts and the orders of the Board of Agriculture, will ensure that the positions are occupied by men who are not allowed to fossilise, but who, of necessity, must be up to date and well versed in all the subjects pertaining to Veterinary Sanitary Science. In the Memorandum which has been issued by the Board, a copy of which we publish in another column, we read that the Permanent Veterinary Staff (appointment on this carries with it the right to be placed on the pension list) will consist of thirteen officials, all of whom must be duly qualified veterinary surgeons, with salaries ranging from £300 to £1,000

per annum; whilst, in addition, there will be twelve Assistant Veterinary Inspectors, with salaries of from £200 to £300 a year.

The Board of Agriculture is to be congratulated on its enlightened policy, and we are quite sure that the result will be beneficial to the interests of animal hygiene, and will show practical results which will be of the utmost advantage to the health and wealth of the community.

GLANDERS IN LONDON.

AT last the Board of Agriculture has decided to seriously undertake the eradication of glanders from the equine community, and the Veterinary Inspectors of the London County Council, several of whom have held this position for nearly thirty years, have received notice that after another six months their services will not be required and that their places will be occupied by men whose sole duties will be to deal with contagious animal diseases; private practice and outside work not being allowed. This is as it should be. The employment of a number of veterinary experts, men whose especial study will be the eradication of one or more of those diseases which at present devastate the animal community, and many of which are communicable to man, cannot but give a satisfactory issue if only those who have control will follow rational methods, and can obtain the financial support which such a scheme of necessity involves.

If only a reasonable salary is offered, with a prospect that the position is a permanency for life, plenty of eligible candidates will come forward, and a new outlet will be found for those of our younger graduates whose bent lies in the duties appertaining to veterinary sanitary science.

It must not, however, be thought that the failure to eradicate glanders from London has been due in the past, to the fact that the Veterinary Inspectors have been in private practice, and have only occupied a portion of their time to attending to glanders outbreaks. So far as they have been allowed to play their part they have played it satisfactorily and well, but it has been impossible for them to do as they would have wished, and until the present law is altered to enable in-contact animals (or indeed the whole of infected studs) to be summarily dealt with at the discretion of the Inspector, by injection of Mallein, glanders will never be stamped out nor even kept within reasonable bounds.

As the law stands at present an Inspector has no power to enforce the use of Mallein without an owner's consent, and unscrupulous owners have been known, over and over again, to dispose of all the in-contact horses after an outbreak of clinical glanders in the stable, knowing full well that in all probability they

were disseminating the disease by means of horses already infected, but not, of course, showing visible symptoms.

Of necessity, under the new regulations which will be issued, the question of the compulsory or extended use of Mallein to in-contact animals must be the first to receive serious consideration, and horse-owners will have to bring forward the subject of increased compensation for the compulsory slaughter (if this course is adopted) of cases in which no visible symptoms are manifested, and in which the horse might, under ordinary circumstances, be expected to continue in work for a while longer, or, perhaps, even recover. If the reacting animals are not killed, but are allowed to work under periodical veterinary inspection, provided this can be made efficient, and the sale of such horses are supervised in such a manner that they can always be traced (and this would, of necessity, bring the horse repositories under observation), the amount of compensation will be much less, although it will take a few more years to eradicate the disease than if all reactors were killed. The question is whether, in the event of the latter course being adopted, the amount will not be too great for the authorities to ask for, as the extent to which glanders exists in some of the studs of London is simply appalling. Another question of serious import, too, is whether or not an animal which reacts to Mallein, but has no clinical symptoms, is able to spread the infection. Opinions on this are somewhat divided, but experience teaches that no one would willingly keep a glandered horse in his stable, and that it is never possible to be *quite* sure that clinical symptoms have not developed, the lesions not, of necessity, being visible externally. Isolation and frequent expert inspections are the only safeguard where such a project is allowed.

It is to be hoped that the new scheme, by which the County Council authorities will at last have the power they have been again and again asking for, will, within a few years, entirely eradicate glanders from the three or four great cities in which it vegetates, and from which it is spread over the rest of England. It will only remain to impose quarantine restrictions and the use of the Mallein test on all imported horses, and our insular position will enable us to place glanders in the same category as rabies, foot-and-mouth disease, rinderpest, and many others, to practically investigate which the student of comparative pathology has now to go to one or other of those Continental or colonial countries in which they still hold sway.

Original Article.

ON SOME ANOMALIES IN THE SKULL OF THE DOG.

BY R. G. LINTON.

(FROM THE ANATOMY DEPARTMENT, ROYAL VETERINARY COLLEGE, EDINBURGH.)

In the skulls of four dogs in this department are peculiarities of some interest.

The first case is that of a pure-bred full-grown pug (No. 4), * in which both malar bones are divided by a horizontal suture (fig. 1).

Commencing at the middle of the malo-maxillary junction, the suture extends in a curved and oblique direction to the tip of the zygomatic process of the squamous temporal bone, and there terminates.

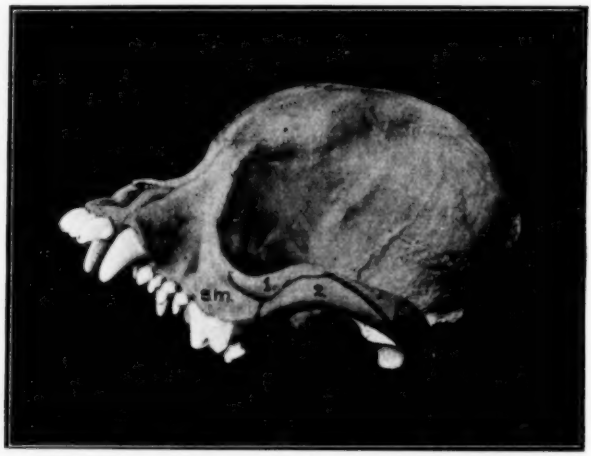

FIG. 1.—Skull of Pug. S.m., Superior maxillary bone; 1 and 2, upper and lower portions of malar bone; t, temporal (zygomatic process).

Thus the malar is completely divided into two parts—an upper, or orbital, and a lower. Of these the orbital portion is the smaller. The condition is identical on both sides of the skull, and is of interest on account of its comparative rarity, and of some importance from its close relation to the manner in which the malar bone is held, by modern anatomists, to develop.

Instances of a similar persistence of a suture, originally present in early embryonic life,† have been recorded as occurring in man and the apes; but a search of the literature has failed to reveal any mention of such a condition in the carnivora. Frassetto (1) details cases of supernumerary sutures in the malar bone of Man, the Simiidæ, the

* The numbers 4, 15, 24 and 28 are the "acquisition numbers" by which the skulls are distinguished in the collection.

† The centres from which the malar develops fuse during the fourth month of intra-uterine life in the human subject.

Cercopithocidæ, and the Cebidæ; and agrees with the conclusions previously arrived at by Portal (2), as early as 1776, that the malar ossifies from three centres. Prof. G. D. Thane (3) cites Rambaud and Renault as stating that the malar develops from three centres, and points out that "to the persistent separation of one of these the divided condition of the bone may be due." The three centres are localised by Prof. Arthur Thomson (4) as follows—one occurs in the posterior part of the bone, and the other two in connection with the orbital process and orbital margins respectively.

A very interesting, and probably unique condition in which the malar of man was divided into two parts—upper and lower—by a backward extension of the maxilla (which articulated with the zygomatic process of the temporal, others forming a temporo-maxillary arch) is described by Dr. Barclay Smith (5). Several instances of malar division are recorded by Ales Hrdlicka (6) in man and monkey.

The suture which is the subject of those notes is apparently equivalent to the horizontal suture which has been found in man and other primates; though in those instances the orbital portion of the bone was invariably the larger of the two fragments. The disagreement in this respect between the already recorded cases and the specimen now under consideration is explicable by the scanty development of the orbital process in the Canidæ.

If the malar of the dog develops from the three centres previously mentioned, we may conclude that the centres for the orbital margins and the orbital process have become confluent, but have failed to fuse with the lower centre. Thus the divided condition has arisen.

The second skull, showing interesting anomalies, is that of a Yorkshire terrier (No. 24), in which are several sutural or Wormian bones. The first to be considered occurs in the coronal suture at the right stephanion (fig. 2). From the following measurements it will be seen that it is a bone of some considerable size—the distance from the pterion to the lower extremity of the ossicle measures 10 mm. The greatest vertical length of the ossicle lies in the same axis as the coronal suture and is 13 mm. in length. From the upper limit of the ossicle to the bregma equals 23 mm. The total length of the coronal suture from the bregma to the pterion equals 46 mm. The bone in its upper third is crossed obliquely by the temporal ridge. On the left side of the skull, and in a similar situation, there are several sutural bones. The largest of these is located at the stephanion, and its greatest diameter is 7 mm.

Another ossicle, in oblique contact with that just mentioned, is, approximately, of half the size. There are, furthermore, three small and inconspicuous ossicles, placed in series in the coronal suture, and removed at least 6 mm. from the pterion.

Calori (7) has described a metastephanic fontanelle ossicle in the skull of a woman; and Frassetto two other similar cases, one in the skull of an Egyptian and the other in that of a Somali. The position of the ossicle in the last is similar to that shown in fig. 2, and, moreover, is not accompanied by a supernumerary intraparietal suture such as was present in the other human skulls. In the skull described by Calori—that of a woman, aged 39—the parietalis divided by a supernumerary suture extending from the metastephanic ossicle to the parieto-occipital suture. In Frassetto's Egyptian skull there is a "Suture surnuméraire pariétal angulaire ptérique." In addition to these

instances of ossicles occurring in the stephanic region of man, Frassetto discusses two cases which he has noticed in the skulls of anthropoid apes, and Virchow (8) one case in the gorilla.

With the exception of those above enumerated, it is seemingly difficult to find records of true stephanic ossicles; and of their occurrence in Carnivora I can find no mention. Jayne (9), however, states that an epipteric bone is very often met with in the cat.

Other sutural bones are present in the Yorkshire terrier, and are asterionic in position. There is one on each side of the skull, and the greatest diameter of either bone does not exceed 7 mm. The breadth of the right bone is 2·5 mm., and of the left 3·5 mm. Mesially to each bone is a hypo-asterionic fontanelle; and on the left side there is some indication of a hypo-asterionic ossicle, approximately of the same size as the asterionic with which it is in contact. The occipital suture of the ossicle is indistinct.

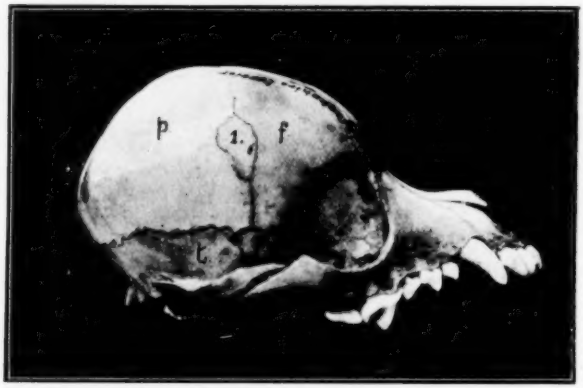

FIG. 2.—Skull of Yorkshire Terrier. P, parietal; f, frontal; t, temporal (squamous portion); 1, sutural bone; s, sphenoid.

Frassetto describes several cases where asterionic and hypo-asterionic fontanelles and ossicles are present in the dog, and similar bones have been recorded frequently in man and other primates.

The skull of a bull-bitch, "Woodcote Pearl" (No. 15), shows an accessory ossicle interposed between the lachrymal, superior maxillary and frontal bones on each side of the head. The right bone is more distinct than the left, its upper extremity being somewhat attenuated and wedged between the superior maxillary and the frontal bones. The bone of this ossicle is in contact with the lachrymal bone and is expanded; and, apparently, the thin edge of the lachrymal is intercalated between it and the maxilla. Both right and left ossicles are in process of fusion with the frontal bone; especially is this the case with the left. The length of each bone is 10 mm.

Dr. O. Charnock Bradley (10) having recently described a somewhat similar anomaly in the skull of a young lion, it would be superfluous to reiterate here what he has already said, and it will be sufficient

to compare, somewhat briefly, the ossicles in the skull of this dog with the above-mentioned instance, and with those to which Dr. Bradley has made reference.

On comparing the locality in which this ossicle is present with the like region of a normal skull from a dog of a similar breed, it is evident that the fragment of bone is not a detached portion of the lachrymal, such as was the case in the lion's skull; nor does it appear to be equivalent to the ossicle which Macalister (11) considers to be "a detached slip of the maxilla." We may rather conclude that it is more nearly equivalent to the ossicle which Grandidier and Filhol (12) found in the extinct hippopotamus (*H. lemerlei*), and to the supernumerary bone described by R. O. Cunningham (13) as occurring in a young lemur, a hippopotamus, a *Macropus* and a wombat.

In the instance recorded by Cunningham as present in the hippopotamus, moreover, the suture separating the ossicle from the frontal bone is, to a considerable extent, obliterated—a condition similar to that in the skull at present considered.

The lachrymal bones in the skull above mentioned, and in that of another bull-bitch, "Silver Stone" (No. 28), are noteworthy, inasmuch as each is divided into two portions by an unusual suture; a condition I have found in two skulls out of forty-one (4·8 per cent.).

The supernumerary suture is on a level with the lachrymal fossa, and involves the lachrymal foramen. The posterior part of the bone is the larger, and takes a more extensive part in the formation of the lachrymal canal. In the human subject the lachrymal bone is not infrequently somewhat similarly divided, and may even be represented by a number of small ossicles (A. Thomson).

Although the lachrymal bone is generally stated to ossify from a single centre, it is evident from the recorded cases of separate ossicles that it *may* develop from several points, if this is not indeed the normal process of origin. It appears feasible to suppose that the several centres usually (normally) fuse at an early period; but that, on the other hand, they may, on occasion, retain their independence for an abnormally long time.

The above instances of additional ossicles are not without importance as showing that the generally accepted notions regarding the development of the various bones of the skull may require a certain amount of revision. Certainly the modern tendency lies in the direction of multiplication of the centres from which the individual bones arise.

For the skulls Nos. 15 and 28 this department is indebted to the kind offices of Prof. F. Hobday.

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Clinical Articles.

BONE DISEASE AMONGST HORSES IN SOUTH AFRICA.

BY CAPTAIN A. H. LANE, ARMY VETERINARY DEPARTMENT, BLOEMFONTEIN, SOUTH AFRICA.

THIS disease has generally been termed "osteoporosis," but I consider that the term "osteomalacia" more truly describes the pathological changes.

I do not think that "osteoporosis" can be looked upon as a disease *per se*, but undoubtedly in this bone disease there is at times a change of compact into cancellated tissue. "Osseous cachexia" would, perhaps, be a more appropriate term. In South Africa, to which country my experience of the disease is limited, it affects horses, mules, donkeys and cattle; but, with the exception of the latter, it is not often seen in the native-bred animal.

Mr. W. Robertson, M.R.C.V.S., Cape Agricultural Department, differentiates between osteomalacia and "osteoporosis," but, after some seven years' experience, I consider that we are dealing with only one disease, which shows itself in many different ways.

This is the view now taken by French veterinary surgeons of note, who have studied the disease in China and Madagascar, and the late Captain Hayes, who had experienced it in several countries, was of the same opinion.

HISTORY.

This disease often appears in the United States, though some writers there seem to confound it with "actinomycosis."

French veterinarians have recognised it in Indo-China, and more recently in Madagascar, where of late years large numbers of imported horses have suffered greatly.

Hayes saw the disease ten or fifteen years ago in India, Singapore,

and South China. Mr. H. B. Elliott, M.R.C.V.S., describes a similar disease in the island of Hawaii.

In India recently it has shown itself, and has proved very expensive in some places, especially in Calcutta (Tagg and Greenhill).

Mr. Duncan Hutcheon, M.R.C.V.S., Cape Agricultural Department, saw a few cases of it as early as 1885, but very little was known as affecting horses, mules, and donkeys until a serious outbreak occurred at Wynberg, Cape Town, 1898, amongst our Army horses.

It has been well known for generations amongst cattle in South Africa, particularly in the midland parts of Cape Colony, where the grass is poor.

During the past three years the disease has been very prevalent in South Africa amongst horses. There have been several serious outbreaks amongst large studs, some of which caused disastrous results, whilst hundreds of cases of one or two separate animals have been witnessed by veterinary surgeons. Most cases have been seen in the Cape peninsula, at Kimberley, and at Johannesburg—places where the staple diet is oat-hay, grown in the western province of the Cape Colony.

I quite agree with Mr. Hutcheon that at the present time this is the most serious and expensive disease with which we have to deal in South Africa.

The largest outbreaks I have experienced are: (1) The abovementioned one at Wynberg, 1898; (2) an outbreak at Middleburg, Cape Colony, 1904, amongst Army animals; (3) an outbreak amongst the horses and mules of the Municipality of Bloemfontein, 1905. I have also seen several other cases this year at Bloemfontein, and also at Johannesburg amongst racehorses.

From what I have seen, I am sure that numbers of cases are constantly occurring, but are not recognised. I have had full proof of many instances of this kind.

Symptoms.

The symptoms of this disease in the early stages are by no means diagnostic, and are often misleading. As any part of the osseous system may be affected specially, the symptoms vary very much, and it is not surprising that veterinary surgeons, with no previous experience of this disease, should have altogether failed in their diagnosis, and the symptoms attributed to rheumatism, navicular disease, &c.

Generally the first symptom noticed is lameness, which is often fugitive. The lameness is traced to a particular leg and to a certain joint; the patient is rested and treated, when, after a period (which may be a few days or a few weeks), it is clearly seen that the animal is lame in another leg. The lameness can, as a rule, be traced to a certain joint; any joint may be affected. There is often an absence of the usual signs indicative of lameness, as regards swelling and heat; but there is generally tenderness on manipulation, and lameness is shown by the animal when moving.

Exostoses are in many cases thrown out, giving the appearance of ringbones, spavins, splints, &c. Veterinary surgeons are constantly misled by these lesions, thinking that they have ordinary cases to deal with.

These bony growths, however, do not yield to the ordinary treatment of counter-irritation. I have seen at times a soft swelling of the knee, which later subsides if the animal is inclined to recover.

In advanced cases of lameness in the fetlock joints a bony enlargement will form all round the joint, and I have seen this also in the hock.

Some cases at first seem only to be going short in front, like navicular disease. When the disease is more advanced it seems as if every joint of every leg is painful, giving a peculiar tottering gait. The pain is shown when the weight is thrown on the leg, on the joints, and not in extension or flexion.

Curiously enough, the greater number of animals affected are to all appearance in good condition during the first stages. In many cases the first symptom is stiffness of the back—the lumbar region—which may appear suddenly, the animal rises up with difficulty, and has the appearance of having been cast in the stall.

On pressing the lumbar region pain is evinced; on trotting the hind limbs are moved very stiffly; there is an inclination to canter behind rather than to trot and use the legs singly.

Some of these cases, a day or two after admission, were unable to rise, and on examination were found to have fractured vertebræ. The vertebræ in these cases were very soft, and could be broken with the fingers.

Other cases had to be lifted up for some weeks, but under proper treatment they recovered sufficiently to trot about, although generally the hind limbs were moved stiffly. Some, after rest of a week or so, will come out sound, but when given work go lame again, often in another joint. Both shoulder-joints are sometimes affected, and as the disease advances the animal can scarcely move. There comes a time when there is a gradual loss of flesh, and although the animal has plenty of good food and eats well, he becomes very emaciated. The belly becomes drawn up, and the whole framework of the body seems to have shrunk, the abdominal muscles are contracted, and the "pleuritic ridge" is sharply defined.

On close examination of these cases several ribs were found to be broken; some of these fractures were later found to be held together by a fibrous callus.

The disease in some cases will show itself quite suddenly. Animals to all appearance healthy and in good condition will suddenly break down (in the fetlocks or hocks this is most commonly seen), the weight of the body and the force of the muscular contractions being greater than in poor animals. Last year several horses of the 16th Lancers at Middleburg, Cape Colony, suddenly broke down in their fore fetlocks; some of these showed fracture of the sesamoids, in others the ligaments had come away from their attachments, the bone being diseased.

During my first week at this camp I saw two mules, to all appearance in good condition when at work, suddenly break down in the hock-joint. There was no real fracture, but the ligaments of the small bones of the hock had come away from their attachments. I have experienced a number of cases of this kind, some of which were among valuable racehorses.

I have seen fractures of the legs without any cause other than

lying down and getting up, and perhaps slipping a little. In some cases there is enlargement of the maxillary bones. This is not, as a rule, seen except in cases of long standing, where animals have been affected for four to six months. These enlargements are symmetrical, and are thus unlike the enlargements in actinomycosis.

Some people are of opinion that no horse, mule, or donkey can be diagnosed as suffering from "bone disease" unless the head is affected in this way. This idea is erroneous. I have seen hundreds of cases of long standing, which were severely affected for fully six months, without any head symptoms.

The disease may especially effect any part of the bony system. It generally concentrates in the irregular bones. The vertebræ, more particularly the lumbar region, sometimes in the head, often the shoulder-joints, the pelvis, or the ribs. A peculiarity in this disease is that although the maxillary bones of the head are enlarged, the appetite still remains good—even voracious—the process of mastication being carried on for a long time fairly efficiently. In a very few prolonged cases, however, the teeth became loose and the food was not properly chewed.

In Madagascar the disease seems to appear in an acute form, beginning with the usual symptoms of what we term here "biliary fever" or "malarial fever." The disease runs a rapid course, often of only two or three weeks; on *post-mortem* examination the bones show the usual symptoms of "bone disease."

Some cases I had in the Cape peninsula in 1898 seemed to develop quickly, and these were horses which had a short time previously suffered from severe attacks of "biliary fever," but some of the acute attacks described by French veterinarians, as seen in Madagascar, I cannot quite reconcile, as regards symptoms, with any cases experienced by me in this country. I think it very probable that the disease of the bones had been going on in a latent form for several weeks or months before the attack of fever. However, the disease, in the damp climate of the sea-coast of South Africa, certainly at times runs a much quicker course than on the high veldt.

From the above it will be seen that the symptoms of this disease may vary greatly. When it is considered that sudden and undiagnosed fractures often occur, and that the lumbar vertebræ are so much affected so that there is pressure on that portion of the spinal cord, it will be then understood what extraordinary and varying symptoms may appear.

Cause.

There is a good deal of difference of opinion as to the cause of this disease.

Messrs. Hutcheon and Robertson, Cape Agricultural Department, who have seen some hundreds of cases during the past three years, are strongly of opinion that the origin is microbic; though no organism has been isolated, and inoculation has failed to produce the disease. Against this theory is the fact that the progress of the disease may be arrested by feeding on nutritious food containing a good proportion of lime and phosphates. Further, infective diseases run a regular course, in spite of change in food and surroundings.

French veterinarians who have studied the disease, more especially in Madagascar, consider it is caused by an absence of lime salts and phosphoric acid in the food, though latterly some of these gentlemen have surmised the microbic theory, although they at the same time still hold that diet has a great share in the cause, if not the sole cause.

The soil of Madagascar in most parts is found deficient in lime salts and phosphoric acid.

Paddy (rice) is the principal diet of animals in that country. It is noticed there that animals at the coast ports, fed on imported forage, do not show this disease, but up country, where the forage is grown locally, bone disease is the curse of imported animals.

Mr. J. Tagg and Mr. T. Greenhill, who have seen many cases in Calcutta, consider the origin dietetic, owing to a low innutritious diet; and these gentlemen think, as I do, that there are many more cases of this disease than we are aware of. Hayes attributed the cause to feeding on innutritious grass and hay, even though good oats are also given, judging chiefly from what he saw in Hong Kong and at the Bahawulpore Stud Farm, India. This quite agrees with my experience.

Hayes even goes so far as to think it is due to some specific poison contained in the fodder. I am not prepared to say as much as this, but certainly some of the histories related by Messrs. Hutcheon and Robertson seem to point to this. In the United States, authorities rather incline to the microbic theory of origin.

Although I have seen many isolated cases, my experience is based chiefly on three very serious outbreaks of this disease, in each of which a large number of animals were affected.

So far, my experience has not given me the idea that this disease is infectious. Everything, as regards origin, has always pointed to malnutrition to a general disturbance of nutrition—to prolonged feeding on a diet of low nutritive quality. The affected animals in all three outbreaks (which I relate below) had been fed for many months on a monotonous diet of mealies or oats and South African oat-hay, principally grown in the Western Province of Cape Colony, especially as regards the oat-hay.

This diet, I have often noticed, does not seem to agree with imported animals, especially those which have been through a great deal of hardship and exposure, or have suffered from malarial or biliary fever, and consequently have their digestive systems impaired, as has been seen so much in Madagascar.

Malassimilation has a great deal to do with this malnutrition. The digestive system, after some months, evidently tires of this insipid diet.

In certain districts of South Africa, especially in Western Cape Colony, there is a considerable deficiency of lime salts and phosphoric acids in the soil. The farmers grow oat-hay on the same ground for many consecutive years, without any rotation of crops and without using any fertiliser. The last three or four seasons have been very dry. In dry weather there is a lack of fluid to dissolve the lime salts in the ground and convey them to the roots of the crops and grass. In fodder of a coarse and woody, fibrous nature the lime salts

are often soluble to a small degree only, and very little of them is absorbed.

Analysis of the Western Province oat-hay has shown a deficiency of lime salts and phosphoric acid as compared to that grown in the Transvaal, and as compared to the English standard.

I take it that an animal depends for the nutrition of the osseous system more on its hay and grazing than on its grain ration.

My experience agrees with what Williams states in his "Surgery": "This disease is in some way connected with the food or with mal-assimilation of the food. It seems as if it were due to the absence of some essential ingredient of the food, or to its presence in such small quantities as to be insufficient for the necessities of the animal." "The food does not form a proper pabulum."

My first experience of this disease was in November, 1898, at Wynberg, Cape Town, amongst about 400 small horses, which had been brought over from the Argentine sixteen months previously. From July to September, 1898, a large proportion of these horses had been lame or stiff, and I was greatly puzzled at times in locating this lameness. There had been a few fractures, including two of the lumbar vertebræ. I was away in Basutoland in September and October, and when I returned in November there was a still larger number of crippled horses, and four had been destroyed for fractures. Almost the first day after my return I was asked to look at a horse "kicked on the head." This horse had the typical enlargements of the maxillary bones. On inspection I found several others with these symptoms. I then knew what the disease was, and called in Messrs. Hutcheon, Borthwick and Robertson, Cape Agricultural Department, to whom I showed about fifty crippled horses. These gentlemen fully agreed about the disease.

Mr. Hutcheon came again on two or three occasions, and was most kind in advising and helping me, and pointing out other affected animals.

These 400 horses had been fed, since arrival, on mealies and oat-hay (locally grown), with a little bran and salt. They had suffered great hardships, standing in the open all through the rainy season, consuming quantities of sand with their food, as there were no mangers, and often no nosebags. Almost every animal had had "sand colic" and "biliary fever."

Arrangements were then made for better care and shelter, and I advised the ration to be changed to oats (New Zealand), 6 lb.; bran, 2 lb.; Argentine lucerne, 8½ lb.; green forage, 4 lb.; salt, ½ oz.; bone meal, 1½ oz.

Unfortunately, this change was not carried out until January 16, as the authorities refused to recognise the existence of this disease.

Lime was put in the water, which on analysis had shown an almost total absence of calcium. The effect of this change of diet and more care was soon very marked. In about three weeks every affected animal, however far the disease had advanced, was seen to make some improvement, with the exception of some thirty bad cases (eight of which were destroyed and the remainder were cast and sold); these horses all became workable again, and went up country in October, 1899, on active service.

My second large experience of this disease was in October, 1904,

when I was posted to Middleburg, Cape Colony, on my arrival from England.

At this station there were then: a cavalry regiment, three batteries R.F.A., and a company A.S.C., the latter with 30 horses, 1,000 mules, and 400 donkeys; also other corps with smaller numbers of animals. I found fully 160 mules and 50 donkeys of the A.S.C. Company showing marked symptoms of this disease. Several had enlarged maxillary bones—the enlargement of the inferior maxilla was mostly seen.

There were some 70 other mules and many donkeys which were very suspicious, and which I stopped working. Later, on careful inspection, I found other cases, and cases were found in every corps. The number of horses affected in the cavalry and artillery were only about 50; these cases had come on very slowly. I account for this to the better feeding and general care; also, the crippled horses of these corps had been cast every few months. Several mules could scarcely move, 12 mules and 17 donkeys were down and could not get up, so I destroyed these at once, and later destroyed 5 more mules and several donkeys.

Careful *post mortems* were carried out with other veterinary surgeons. There was no record in any book about "bone disease." These animals were diagnosed as suffering from "sprain muscular," "sprain ligaments," and a few latterly from "rheumatism," and most of them had been blistered in places, but seemingly without beneficial results.

During the previous twelve months this Company A.S.C. had cast and sold 170 mules too crippled for work, and 44 mules and 45 donkeys had died or been destroyed, several for fractures. After a careful enquiry with the other veterinary officers, there seemed little doubt that most of those destroyed and cast had been suffering from this disease.

One point very noticeable in this bone disease is the way that animals, very far gone, unable to get up, often with serious deformities and fractures, still keep alive if fed and watered.

In order to guard against a bias I did not record any of these cases as suffering from "bone disease" until I had consulted at least two other veterinary surgeons in each case, and minor and doubtful cases were not recorded.

The gentlemen consulted were Messrs. Borthwick and Robertson, Cape Colony; Mr. Bell, Transvaal Veterinary Department; C. V. S. Hill, and Lieut. Oliver, A.V.D., all of whom were unanimous as to the existence of this disease. To all of these gentlemen I am greatly indebted.

The History.—Most of these mules were Argentine and North American, and probably most of the donkeys were imported. They arrived at Middleburg in December, 1902, showing no signs of this disease, and were fed on oats and oat-hay (grown in Cape Colony), with a little imported forage, until July, 1903, since which date the grain ration had been almost entirely mealies and oat-hay from Western Cape Colony. They had had no stabling or rugs, and had worked hard; no grazing had been done. About November, 1903, a number of mules and donkeys were noticed lame, and this disease seems to have gradually become worse from that date, more especially during the three months previous to my arrival.

The diet of these animals I changed at once, the mules getting imported oats, 4 lb. to 5 lb.; bran, 2 lb. to 3 lb.; Argentine alfalfa, 8 lb. (or a little green lucerne in lieu); salt, ½ oz. Donkeys, half this ration. Horses half as much again.

The affected animals were placed in sheltered kralls, loose, not tied up. (This is a great point in the treatment.) They were watered three times daily and every care taken.

As these animals got stronger they were turned out into large kraals in the daytime for more exercise.

In about a month there was very marked improvement in practically every case. The only exceptions were two or three animals which had fractures (undiagnosed at first). I then put up a kraal three miles away, where there was fair grazing and good water, and when strong enough the animals were drafted out there, where only half their ration was given to them. They were fed night and morning, and grazed all day. The improvement here was very rapid. Six weeks of this grazing and treatment made most of these mules and donkeys fit to return to duty.

I may mention that this is a limestone district, and the water very hard.

So fast did these animals improve that some veterinary surgeons who had not seen them, or who had only seen some of them on one or two occasions, ridiculed the idea that all these had bone disease.

I can only state that every animal was seen by myself and two veterinary surgeons, and all animals showed some of the symptoms above described, and all improved under the same treatment.

These animals had broken down in their weakest structure, in these cases the bones.

If they had not bone disease, what was the cause of their crippled state, and why did they recover?

The following is a return of the mules treated:—

Total.	Cured.	Relieved.	Died or Destroyed.	Remaining.
369 ...	248 ...	104 ...	17 ...	*Nil.*

Of those marked "relieved," most were sent to "light duty," but owing to pressure of work these animals had to do full duty, and they stood it well. They should have been noted as "cured."

Regarding the donkeys, rather more were destroyed, but otherwise the proportion cured was about the same as with the mules. The horses under treatment were nearly all cases of long standing—about six months. They improved greatly on the new ration, but they were cast and sold as not fit for cavalry or artillery galloping.

Several of the worst cases were animals which had been kept standing still, tied up for some weeks or months (I noticed the same thing in the Wynberg outbreak).

This was particularly seen in animals which had been treated for "lymphangitis ulcerative," a number of which were found to be suffering from "bone disease." This is rather difficult to explain, but the unnatural life—always tied up, rarely lying down—must have affected them to some degree.

If the cause of this disease is microbic, one would think that, considering the frequent thorough disinfection of the lymphangitis section of the veterinary hospital, these organisms would be destroyed.

When I left Middleburg in May last, this disease had disappeared, and no further cases have occurred, except a few suspicious cases in horses which suddenly became very stiffened on manœuvres last September, but which recovered.

The third outbreak I experienced was in May last, at Bloemfontein, when I had just arrived, on transfer from Middleburg. A few days after my arrival I was asked by the Corporation if I would inspect their horses and mules, about 300 in number. I was informed that for about the past six months many of these animals had been going lame or stiff. Three veterinary surgeons had been treating these cases at different times, but there was no improvment. On visiting this stud I found some twelve horses and forty mules showing typical symptoms of osteomalacia, and some thirty others very suspicious.

Their history was as follows: During the war the Corporation drew their forage through the Military Supply Depot. During the latter part of 1902, and up to March 1904, the forage, mealies, oats, and oat-hay were procured from Basutoland and the Eastern O.R.C. Since March, 1904, the oat-hay, then the principal diet, was supplied from the Western Province of Cape Colony. (This latter district produces large quantities of oat-hay, and supplies the principal towns on the main line, viz., Middleburg, C.C., Bloemfontein and Johannesburg.)

About October, 1904, several of these animals began to be lame or stiff, and the severity of the disease and the number affected gradually increased.

The Corporation gave me a free hand. I took four other veterinary surgeons to see these animals, and destroyed two horses and two mules—the worst cases—for *post mortem*. We all agreed as to the diseased state of the bones. I at once arranged for a change of diet for all the stud: good oats, Argentine lucerne, and 1 to 2lb. of bran per day for each working animal. The diseased animals to have 3 lbs. bran daily, mixed with oats. Plenty of salt was supplied.

The affected animals were kept loose in a sheltered kraal, with sand bedding to entice them to lay down.

In four weeks' time I made a careful inspection of all animals and found, generally, great improvement. This improvement was steadily maintained, and those who had been affected gradually returned to work. Some of the worst cases, however, moved in a stiff manner at times. Four months after the change of diet a very great improvement was seen in all the animals of this stud.

Such has been my experience, and I cannot understand Messrs. Hutcheon and Robertson, when they state that they have never seen a case of recovery in an animal kept in the area where it contracted the disease, no matter how treated.

In all the three outbreaks which I have described the affected animals were treated and cured in the same kraals and stables where they had been suffering for many months, except that a Middleburg C.C., when an animal had become convalescent (*i.e.*, was stronger and

trotting sound) it was drafted three miles away from the grazing herd.

At Wynberg the space allowed for these 400 horses was only about five acres. They were never moved from there and no disinfectants were used.

At Bloemfontein no disinfectants were used in the Corporation stables and kraals.

This experience does not point to the disease being of microbic origin. One point, however, is worth pointing out, viz, that most of the cases seen by Messrs. Hutcheon and Robertson were in damp localities. At Wynberg our horse lines were on a hill and on sandy soil—a dry situation for the Cape peninsula. Of course Middleburg and Bloemfontein are very dry places—about 4,000 feet altitude. Undoubtedly, exposure to cold and damp, hard work and hardship generally, must be looked upon as assisting causes of this disease. The reasons that this "bone disease" was little seen during the war are that all animals were then fed almost entirely on imported forage, very little forage being then grown in the country. Since then an enormous amount of oat-hay has been grown in South Africa, particularly in Western Cape Colony, and very little hay has been imported, but, as I have said, the seasons have been dry and the lime salts in the ground have probably not been well dissolved and so conveyed to the roots of the crops. Moreover, veterinary surgeons were then always working at high pressure and had little time for careful diagnosis, even if they understood what to look for.

In August, 1900, I saw about twelve R.F.A. horses with enlarged maxillary bones. They had been left on a farm in the Eastern Free State some months previously, with about 200 other horses, mostly native-bred, and had been very poorly fed. I had then no time to go into the matter.

Mr. Robertson states that the disease had only shown itself to any great extent during the past six years. One reason for this is that no great number of horses and mules were imported previously, also, as I said, veterinary surgeons have only recently learned what to look for.

I have often been asked why this disease has not appeared at other military stations. Besides Middleburg, C.C., the only other station I have to deal with is Bloemfontein, where the animals have been fed since the war, and up to October 1904, on an average of two-thirds imported lucerne and one-third oat-hay (locally grown), with imported oats.

Since October, 1904, the proportion of Colonial-grown produce has been much greater, and I am sure that lately at Bloemfontein a softening of bone, known generally as arthritis, with peculiar exostoses, has a great deal to do with the very large percentage of horses and mules lame and stiff, the bone disease in these cases rarely getting far advanced.

Our sick list here is nearly three times what it would be in England, yet we do not have nearly the same number of cases of catarrh, pneumonia, &c., our cases being mostly lameness and injuries. I have for some years suspected this disease as a cause of lameness—lameness very difficult to diagnose.

Post-mortem Appearances.

The diagnostic *post-mortem* symptoms are only seen in the bones. I have never traced anything diagnostic of this disease in the internal organs, although as regards these the following is what is generally found :—

Liver.—Generally hypertrophied, brick-red or brown, but sometimes yellow, and full of bile. Most cases soft, friable, and granular, though sometimes I have seen it hard.

Spleen.—Almost always enlarged; often almost black on section, and much softened.

Kidneys.—In some cases sclerotic and yellow; in others enlarged and darker in colour, with the suprarenal capsules enlarged; but in a few cases I have seen them atrophied and pale.

Bones.—In the earlier stages, horses slightly lame at times, &c., a most careful *post-mortem* examination will show practically nothing abnormal to the naked eye, but microscopically it will be seen that the bones in places have undergone a change, particularly near the joints.

The appearance of the bones depends to a great extent on what part of the osseous system is especially affected. In most cases the vertebræ, "particularly the lumbar," and the ribs are most diseased. These bones are often found in such a decalcified state that they can be cut with a penknife, and in advanced cases can be pulled to pieces with the fingers. The other irregular and flat bones are often found to have undergone this peculiar degeneration.

The cancellated tissue is infiltrated with blood, and in advanced cases with a reddish gelatinous substance. The arachnoid fluid is abnormally increased.

The spinal cord in the vicinity of the affected vertebræ is greatly softened, and contains hæmorrhagic spots, and the meninges are easily detached.

Long Bones.—In many cases the long bones at first sight seem fairly normal, but, except in the very early stages, extreme lightness will be noticed. This lightness of all bones, reduced often to one-third the normal weight, is very marked.

The articular cartilages are much thinner than normal, and in advanced cases many joints showed considerable inflammation and ulceration.

In cases where there had been very great lameness, the articular cartilage had a "worm-eaten" appearance, or had quite disappeared in places, leaving a roughened surface.

The capsular ligaments of many joints seemed to be abnormally thickened, and often contained an abnormal amount of synovia. In these cases the articular cartilage and ligaments could easily be removed with the fingers.

The periosteum, as a rule, did not come away easily. The more diseased long bones were in connection with a joint in which the animal was very lame.

On making a longitudinal section of one of these long bones the wall is found very thin, and the medulla in a very abnormal condition, generally very sanguineous, but often one half of the medullary canal is filled with a peculiar gelatinous substance, and the other half with

clotted blood and serum. The compact tissue at the extremities of these bones has become very thin, and in places has almost disappeared, and the amount of cancellated tissue is increased. The medullary canal becomes enlarged at the expense of the bony tissue—the wall. The degeneration is from within outwards.

Head.—When the head is affected the symptoms consist chiefly in the enlargement or bulging out of the maxillary bones, the inferior maxilla is more often affected.

All the bones of the head become more or less softened, and seem to have undergone the same form of degeneration as the other irregular and flat bones. I take it that the pressure of the teeth causes the maxillary bones to bulge in this way. These enlargements are almost symmetrical.

On cross section of the enlarged maxilla sinuses in advanced cases they are found completely filled with a peculiar granulation tissue, generally of a pink colour, which on cutting appears of a gritty nature owing to small pieces of bone contained in it, probably detached bony plates. This granulation tissue is found in smaller quantities in the other bones of the head.

In animals which have broken down suddenly, as in the fetlocks and hocks, it is found that the ligaments and sometimes the tendons have come away from the bone at the point of attachment, and often a small piece of bone is found attached to the extremity of the ligament. The ligament is healthy, but the bone so diseased that it could not hold the ligament.

These cases have all the appearance in the living animal of fracture. There are, however, as a rule, no real fractures of bones, except sometimes the sesamoids.

In the earlier stages the bones become congested with blood; later there is a general decalcification from within outward, the bony tissue becoming fibrous.

There is at first atrophy of the bone cells, and later they are abnormally enlarged, becoming transparent and changing into fat cells. The bone loses its homogeneous structure, and becomes medullary tissue, its specific gravity being lessened. The Haversian canals increase in size by absorption of their walls, and are filled with a gelatinous fluid, in advanced cases containing the pink granulation tissue.

Heredity.

About 100 donkeys at Middleburg were mares in foal. As long as they were suffering from "bone disease" the foals in most cases died within a week of birth, but as soon as they became convalescent and were sent out to graze, and led a more natural life, the foals did well and grew up strong and healthy.

A pony mare, one of the worst cases of this disease at Middleburg, foaled when she was suffering greatly. This foal was very delicate at first, but improved gradually as the mare improved.

Treatment.

I have carried out several experiments as regards feeding and medicinal agents.

At Wynberg, 1898, I put twelve affected horses under treatment for rheumatism, and gave antacids, salicylate of soda, &c., but without beneficial results.

A series of experiments were carried out at Middleburg, 1904-5.

Seventy affected mules and fifty donkeys were fed on a diet of oat-hay only for sixteen days.

These animals became much worse, and several had eventually to be destroyed.

I then experimented for some months with four different batches of twenty affected animals in each batch.

Bone-meal was tried, also phosphorous (one-third grain doses). Bone-meal is probably useful where the food is deficient in bone-forming materials. The phosphorus, after four weeks, caused purging, and had to be left off for two weeks, and then was continued two weeks longer. This drug may be of some help. If used, however, I think it should only be given for two weeks at a time, and then left off for a week. But I would suggest trying some less irritant form of this drug, or some of the many preparations of phosphate of lime.

I do not, however, think that the twenty mules and twenty horses which were treated with phosphorus and a good varied diet did any better than the other animals on the same diet without the phosphorus.

A section of 150 mules at work were fed on oats, 5 lb.; bran, 2 lb.; Argentine lucerne, 8 lb., and a little green lucerne freshly grown; salt. No bone-meal or phosphorus.

These mules, many of which had been stiff at times, and were very suspicious of bone disease, steadily improved and did well—quite as well as another section of 150 mules (working and living under the same conditions as the other section), which got the same diet with $1\frac{1}{2}$ oz. of bone-meal daily per head in the food. But I think that the bone-meal made from bones of animals in this country is not very rich in phosphates and lime.

These experiments went to prove that, both for preventive and curative treatment, what is required is plenty of good leguminous hay —Argentine alfalfa being the best, and the next best the freshly grown lucerne.

Good imported oats, such as New Zealand, are evidently very beneficial. A certain amount of bran (say 1 to 2 lb. per head per day mixed with the grain) certainly aids digestion and assimilation; but too much bran is not advisable. Oil-cake or well-boiled linseed is of help, and plenty of salt (say 1 oz. per head daily) should be given.

As a rule, grazing in this country does good.

If the water contains no lime, put a little unslaked lime in it. There is no danger, as its solubility is very slight. Let affected animals be loose, not tied up; if very lame, put in a loose box or small enclosure. They will thus lay down more and exercise their joints a little. If, however, fracture is suspected, or the tearing away of ligaments from their attachments, the patient must be tied up, and perhaps slings will be required.

Gradually increase the exercise as the animal becomes stronger, or put in a larger enclosure.

Thus, being loose, and giving gradually increasing exercise, are most important parts of the treatment.

If the affected animals have been fed principally on oat-hay, it is best to leave it off altogether for a few months. No treatment seemed to have any effect in reducing the enlarged maxillary bones. I saw, however, in April and May last many animals with these enlargements sufficiently recovered, as regards their framework, that they were able to do ordinary draught work without bad results.

In conclusion, I do not advise giving artificial agents when the ingredients wanting can be given naturally—*i.e.*, by giving food containing a proper proportion of these constituents.

SUCCESSFUL CASE OF GASTRO-HYSTEROTOMY IN A HEIFER.

BY W. J. TURTILL, V.S., ASHBOCKING.

In recording this interesting case, I do so with a certain amount of diffidence, with a hope that it may induce others to try, under like circumstances, to give surgery a chance. The history of the case is as follows:—

I received a summons to attend a red-polled heifer, the property of C. F. Marriner, Esq., of Thorpe Hall, Hasketon, near Woodbridge, on the morning of December 29, which some three weeks previously had shown every indication of calving, with a good bag, &c.; still, nothing was seen of the calf, and as she appeared to be in good health and feeding well, the cowman came to the conclusion that she must either have lost it, or that it must be dead in her, but her bag, after the first week, began to waste, and all appearances went off.

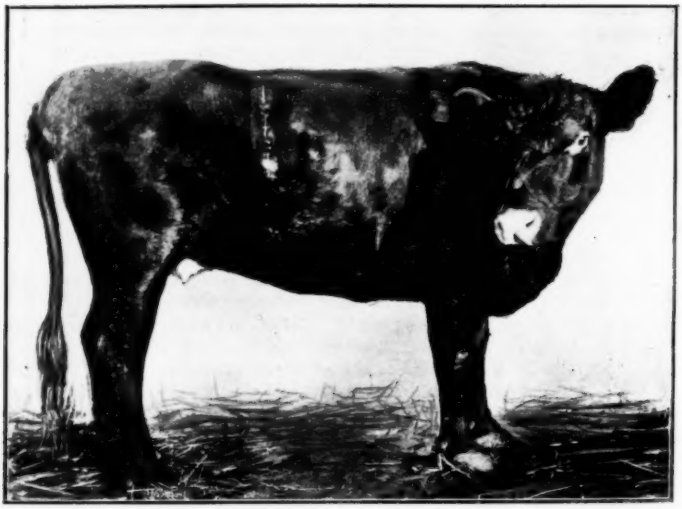
On my arrival I found her in a very distressed condition, constantly straining and voiding a coffee-coloured fluid from the vagina. I proceeded to thoroughly cleanse and disinfect her externally. I found, on examination, that the vagina was so closed that I could only introduce my fingers cone-shaped up to the third knuckles, but enough to feel a detached tooth of calf, which gave me an idea of the advanced decomposition it must be in.

I at once came to the conclusion that it was impossible to deliver her in a natural way.

I at once informed my client that the only chance of saving the heifer would be by an operation, to which he consented at once.

I cast her, by drawing her legs out with ropes, on her left side. I might say I was totally unprepared for the occasion; still, I considered immediate action was demanded, and after cleansing and disinfecting the seat of operation I cut down upon the uterus, with no little difficulty, as, the heifer being full and the calf emphysematous, the bowels would force out of the opening; but with a hook knife I made a bold cut across the uterus and secured the hind feet and brought them up behind the bowels. My assistant striding over the heifer, lifting the calf as I released it, I then secured the placental membranes mixed with a quantity of hair from the calf. I mopped out

and cleansed the wound, using "Lysol" as the disinfectant; and, by releasing the upper leg I sutured the abdominal muscle, leaving the ends to hang through the external wound. On completion of the operation I gave an aperient with whiskey as a stimulant, and with careful nursing she made an uninterrupted recovery, her temperature never rising above 103½°.



Photograph of the site of the incision, thirteen days after the operation.

The photograph was taken by my brother on January 11, 1906, two weeks after the operation, and she is now grazing rapidly, and showing nothing of what she has gone through.

I must say I was surprised to see so little disturbance after such a major operation.

RETENTION OF THE "MECONIUM" IN A FOAL.

BY HENRY B. EVE, M.R.C.V.S., FOLKESTONE.

Subject.—A cart colt foal, two days old, weakly, and not well developed, as it was prematurely born.

History.—The mare which was the mother of the above had foaled all right unaided, had an easy time, cleansed, and appeared healthy.

Symptoms.—The foal is uneasy, refuses to suck, and continually tries to defæcate without any result, which act is accompanied by tenesmus, and colicky pains. It persistently lies down when left alone,

but on being made to stand it arches its back, frequently turns its head towards its flanks, grinds its teeth, neighs continually, paws the ground, and shows general signs of pain and misery. The eyes are injected and the pulse and respiration are frequent; micturition is suspended and the abdomen is distended.

Diagnosis.—Constipation, due to the retention of the meconium.

Prognosis.—Guarded, as I feared that enteritis would set in.

Treatment.—Removed some hard fæces present in the rectum with a well-oiled finger, and drew off the urine with a catheter. I ordered frequent enemas of glycerine and warm water, and gave internally an aperient draught composed of two ounces of the farmer's ordinary butter, melted down, into which I put a dose or two of liq. extract cascara sagrada, euonymin, and extract nux vomica, which had the desired effect, as the bowels acted in about four hours from the first dose, and the meconium was gradually expelled from the intestines. The foal from that time gradually improved, started sucking of its own accord, and in three days became lively, soon being on the road to recovery.

RUPTURE OF THE SPLEEN CAUSED BY A KICK.

BY CAPTAIN R. C. COCHRANE, A.V.D., WOOLWICH.

THE following case came under my observation lately.

A horse which was standing alongside another was reported as having been kicked by him. On enquiry the following history was ascertained: In the morning about 7 a.m. the horses had to be separated owing their disagreeing, and as soon as the injured animal was alone in the box he lay down suddenly, and refused to get up or attempt to do so.

On my arrival soon afterwards the animal was examined externally, a severe contused wound being found on the internal side of the off tibia, together with marks of kicks on the flank and near side over the abdominal ribs, although no symptoms of any fracture could be observed in either place.

The temperature and respirations were normal, the pulse weak.

As the animal did not appear in any pain and was lying quietly he was left alone, after being well bedded down.

About 3 p.m. the pulse was much weaker and the mucous membranes very pale. The animal got up and lay down again in about half an hour's time, lying perfectly quiet till 8 p.m., when he got up and stood till 9.30 p.m., but whenever he moved he seemed giddy and not to be fully conscious of what was going on around him.

From 9.30 p.m. till 3 a.m. the next day he lay without moving, then he got up with much difficulty, stood up for about ten minutes, and fell down practically unconscious. He died at 4.45 a.m.

From 3 a.m. the pulse was imperceptible, and the mucous membranes almost white. The animal ate no food from the time the injury occurred.

Post mortem revealed the abdominal cavity full of blood, discolouration of the mesentery round mesenteric vessels, and the spleen, which weighed 8 lb. 8 oz., ruptured on the internal aspect.

As shown in the photograph, the stomach was larger than normal and full of food. There was no wound on the side of the ribs, but marks had been seen soon after the injury occurred.

Remarks.—The point of interest in this case is the slow rate of death; an injury sufficiently severe to rupture a spleen might reasonably be expected to cause death from hæmorrhage in a very few

A ruptured spleen (internal aspect), the result of external violence.

minutes, but in the case recorded it took almost twenty-two hours, in spite of two distinct rents, the smaller being four inches in length, and the larger, which was V-shaped, ten inches.

Why should ruptures of the spleen occur more frequently on the inner face? Bearing in mind that the cause of laceration is invariably external violence one would have considered that the external and not the internal face would have been the seat of rupture.

The injury causing the rupture appeared, on external examination, very slight. The animal which caused the injury was unshod behind.

A BADLY SET FRACTURE.—OPERATION AND RECOVERY.

BY T. F. PRIME, M.R.C.V.S., UPPER NORWOOD.

THE patient, an Irish terrier, was brought to our infirmary with a badly deformed hind leg, the deformity being due to a badly set fracture of the tibia, in the lower third, which we were told had been comminuted and had taken place some two months before. The fracture had been a bad one, and a piece of bone had been removed. When walking, the leg was completely bowed outwards, and the dog carried it so clumsily that the owner was continually stopped by people in the street and advised to have the animal destroyed on account of the apparent cruelty.

I suggested that the only treatment lay in refracturing the leg and again setting it in splints.

Under chloroform, and with strict attention to antiseptic details, an incision was made through the skin, on the outer side of the tibia, about half an inch above where I intended to break the bone. The leg was then placed on a thick, solid piece of wood, the incision was pulled downwards, and a sharp carpenter's chisel, which had been previously boiled, was placed against the bone and gently tapped with a mallet. The tibia was almost cut through, care being taken that the tissues on the opposite side of the bone were not injured. By manipulation with the hands the bone was then completely broken through, placed in its proper position, and reset in a plaster bandage, space being left in order that the skin wound might be dressed.

Recovery was practically uneventful, and after the operation the deformity was scarcely perceptible.

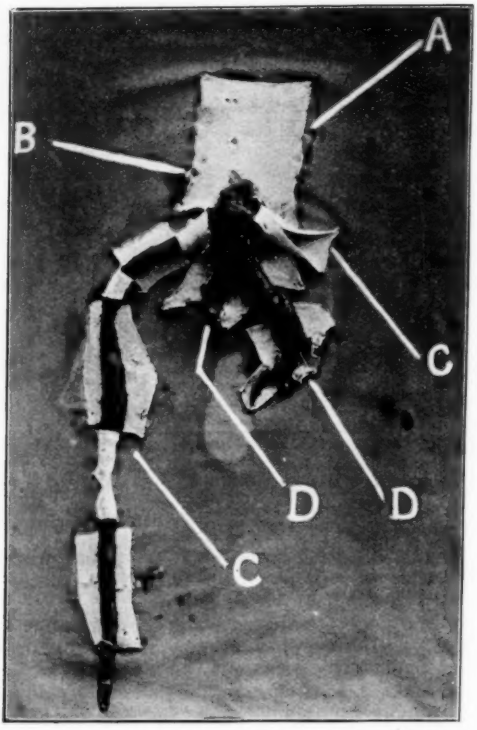
THROMBOSIS IN A POLO PONY.

BY H. S. ELPHICK, M.R.C.V.S., NEWCASTLE-ON-TYNE.

THE subject was an aged black polo pony, the property of a gentleman resident in Newcastle. A very game and clever animal, and one which had never been sick or lame.

On November 24, 1905, a message was sent to us "to come as soon as possible to see a horse which is very lame in its stifle." I went within a few minutes of the receipt of the message, and found that the pony, in being taken out for exercise, had slipped up on a crossing, his off hind leg slipping out behind him, but the pony not falling. I arrived within half an hour after the occurrence, and the groom had meanwhile applied hot cloths to the stifle, and now informed me that the pony was all right again. I had him out and could find nothing wrong with him. It was going quite sound. I ordered gentle exercise the following morning up and down the lane in which the stable is situated. After exercising him for a little while, the groom noticed that he became lame, so he put him back into the stable and sent another message down to us. My father this time went and saw the pony and he was then going sound when he was brought out. Rest was ordered. He was again seen by my father on the following Mon-

day and was only a little lame. Further rest was ordered and he was again seen on Thursday, November 30. He then went no better and no worse. I visited him on December 2 and 5, and found him in the same condition. He was again given another week's complete rest and was seen on December 12 by my father, my brother (Clement Elphick) and myself. On this occasion I rode the pony on the Town Moor and was glad to get off and lead him home, he was so lame. On his return to the stable he showed much pain in the limb, just as if he had cramp, continually lifting it from the ground. As we suspected thrombosis, I then and there examined him *per rectum*, and found that I could feel



A, The posterior aorta; B, origin of circumflex iliac artery of right side; C, external iliac arteries, left side partly patent; D, internal iliac arteries.

pulsation of the left external iliac artery, but not of the right, which was very hard. I saw the owner and advised slaughter, but as he was so much attached to the pony he asked me to try some further treatment. I put the animal on potassium iodide and biniodide of mercury and advised a long rest—at least seven or eight weeks. He was visited again on December 28 by my father, but he was not taken outside his box. He was as lively as ever, and jumped about and rolled in his

box. The treatment was persevered with and the pony not seen again until January 24, 1906, when he was trotted up and down the lane in front of my father. He still went lame—more lame, in fact, than before. He was seen again the following day and on Sunday, but was no better. On February 1 I again had a ride on him, but he became so very lame that I had to get off and literally drag him to his stable. Here he was in such pain that anodyne medicines had to be given. I called on the owner the same afternoon and he consented to have the pony destroyed. The animal was shot that evening.

Next day my brother and I made a *post-mortem* examination on the pony. All the organs (thoracic and abdominal) were healthy. We found extensive thrombosis of the external iliac and internal iliac arteries of the right side, and partial blocking of the left external iliac and complete blocking of the left internal iliac arteries.

The accompanying photograph, taken by my father, from the dissection made by my brother, illustrates the condition of things very well. Unfortunately, the dissection was made upside down, thus making the right side appear to be the left.

I am sorry I did not examine the condition *per rectum* before I shot the pony, as I am sure I would have found that it had extended to the left side, between my first rectal examination (December 12) and the time of his death. I am more strongly convinced of this because he was in such very great pain, and because he showed pain in *both* hind legs (he did not know which to put to the ground), and not only in one as when I first rode him.

At no time was there coldness of the quarters or extremities, and at no time was there sweating, either patchy or profuse. I mentioned that the pony was very game, and this may have stood him in good stead and kept him from sweating. He did not show any exaggerated action, such as stringhalt, when out, but rather trailed the leg.

I would ask one question: Was the stepping on the crossing the original cause of the thrombosis, or was it a coincidence?

The pony was never known to be lame before.

MULTIPLE ADENOCARCINOMA IN A BULLDOG.

BY GUY SUTTON, M.R.C.V.S. OXFORD STREET, LONDON, W.

SINCE February, 1905, I have had constant opportunities of observing the subject of the following note.

The animal, a well-bred bull bitch, somewhat fat, and weighing over 60 lb., was 7 years of age. On several occasions during the last twelve months she had suddenly developed lameness in her left hind leg, and gave evidence of pain when efforts were made to rotate the stifle joint, and also when the skin over the course of the sciatic nerve was manipulated. These symptoms were put down to rheumatism, and subsided in about a week under appropriate treatment. In the early part of November she had one or two severe attacks of vomiting, accompanied by diarrhœa of a dysenteric character. Her lameness at this time became acute.

I now inspected her carefully. Her appetite was irregular; she had lost weight, and the muscles of hind limb were much atrophied, probably from inaction. The rectal temperature was 101°; her pulse was without its normal intermittency and gave a marked dicrotic thrill to the finger at the femoral artery.

Early in the present year the passage of dysenteric stools became constant, and she rapidly lost flesh, until by the first week of February she was reduced to about half her original weight. She became so weak that walking was impossible, and she was therefore painlessly put away.

The autopsy demonstrated the presence of one very large tumour, and a number of smaller, dirty white coloured tumours in the liver substance, and Sir John McFadyean, who kindly examined them, stated that they were adenocarcinomata.

In regard to the lameness the stifle joint showed nothing abnormal to the naked eye, and I am sorry I did not carefully inspect the sciatic nerve, for it is possible that a small cancerous growth on the course of the nerve had something to do with this.

It is an open question as to the duration of internal malignant growths in animals before symptoms become manifest, but from all I can gather this subject appeared to be in perfect health until about a year ago, when the lameness developed. I am told that this particular family have all died before reaching old age, but have been unable to ascertain the causes of their deaths.

THE NEW ARRANGEMENT OF THE PERMANENT OFFICIALS OF THE BOARD OF AGRICULTURE.

A. 245/1906.

MEMORANDUM.

Veterinary Staff of the Board of Agriculture and Fisheries.

THE Treasury have authorised the employment of the whole of the veterinary staff of the Board for work arising under the Diseases of Animals Acts generally, and have at the same time agreed to certain alterations as regards the number of inspectors to be employed and the rate of salaries attaching to the various posts. When the new arrangements are completed the permanent establishment will consist of the following officers, all of whom will be pensionable, viz.:—

1 Chief Veterinary Officer	£800 to £1,000 after 5 years.
1 Assistant Veterinary Officer ... ... The present holder of this post will retain his right to rise to a maximum of £750 per annum.	£500 × £20 to £700
1 Superintending Veterinary Inspector ...	500 × 20 ,, 700
4 Veterinary Inspectors... ... ... (with an additional allowance of £100)	300 × 15 ,, 400
6 Veterinary Inspectors	300 × 15 ,, 400

Before an inspector not at present on the permanent establishment is promoted to one of these permanent posts, he will be required to pass an examination in theoretical and practical animal hygiene

(including tropical medicine), as well as in the Diseases of Animals Acts and the orders of the Board made thereunder. As regards veterinary subjects, the examination will be one in which a veterinary surgeon who has studied at one of the post-graduate courses at one of the veterinary colleges might be expected to qualify without further special study. Inspectors who have not already taken such a course will be given special facilities for doing so shortly before their examination. The examination in the Acts and orders will be that prescribed for Inspectors of the Animals Division. If any officer at present serving in the Department fails to pass his examination, the Board will be prepared to submit his name to the Commissioners for re-examination at the expiry of one year from the date of the failure.

Permanent veterinary inspectors will be liable to be employed either on the general work of the Animals Division or upon duties at the ports as the Board may direct.

The Treasury have also sanctioned the employment of twelve assistant veterinary inspectors, with salaries, for inspectors appointed after the date of this Memorandum, of £200 by £10 to £300. These are temporary posts, and carry no superannuation rights. The salaries of temporary veterinary inspectors, whose services may be retained after the date appointed for the new scale of salary to come into force, will rise by the same increment to a maximum of £300. They will, however, be required to qualify for promotion to the permanent staff by submitting themselves for examination in the manner above indicated at dates to be hereafter determined upon. The requirements as regards any future appointment to the post of Assistant Veterinary Inspector (non-established) will be that the candidate shall have graduated as Member of the Royal College of Veterinary Surgeons at least two years before the date of any proposed appointment to the post, and that he shall be required to show that since such graduation he has been engaged and has acquired practical experience in some recognised branch of the veterinary profession. The employment of an Assistant Veterinary Inspector under the Board will be probationary for a period of two years, and the retention of an assistant inspector at the expiration of that period will be conditional on his passing the prescribed examination, at a date not later than the expiry of his third year of service. The services of an Assistant Veterinary Inspector will not be retained after he has reached the age of forty-five years.

T. H. ELLIOTT, *Secretary.*

Board of Agriculture and Fisheries,
4, Whitehall Place, London, S.W.
March 22, 1906.

INSPECTORATE OF THE ANIMALS DIVISION.

No.	Grade.	Scale of Salary.	Status as to Pension.
	LAY INSPECTORATE—		
2	Superintending Inspectors ...	£500 × 20 to £700	Pensionable.
4	General Inspectors	300 × 15 ,, 400	,,
	with allowance of	100	
19	Inspectors (14 non-established) ...	300 × 15 ,, 400	5 Pensionable, 14 non-pensionable.
22	Assistant Inspectors (non-established)...	150 × 10 ,, 250	Non-pensionable.
47			

	VETERINARY INSPECTORATE—		
1	Superintending Inspector	£500 × 20 to £700	Pensionable.
4	Inspectors	300 × 15 ,, 400	,,
	With allowance of	100	
6	,, ...	300 × 15 ,, 400	,,
12	Assistant Inspectors (non-established)	200 × 10 ,, 300	Non-pensionable.
93	Local Vet. Inspectors (in private practice)	Retaining fee of 12 gs. a year in addition to a fee of £1 11s. 6d. for each outbreak or reported outbreak of swine-fever visited.	,,
116			
163			

Board of Agriculture and Fisheries,
Accounts Branch,
March 14, 1906.

TRAGIC DEATH OF PROFESSOR CURIE.

M. CURIE, who shares with Mme. Curie the honour of having discovered radium, was killed in a tragic manner by an accident in the streets of Paris.

At a quarter to three (telegraphs our Paris correspondent) M. Curie was crossing the Rue Dauphine where it turns into the Quai Conti. It was very wet and the street was slippery. As he left the pavement to cross the street, a cab suddenly came trotting smartly round the corner. In attempting to get out of its way M. Curie slipped on the macadamised roadway and fell under the wheels of a heavy van coming in the opposite direction. The wheels of the van passed over his head, and he was killed instantly.

The body was placed on a stretcher and taken to the Mint police station hard by, where a number of cards and letters were found addressed to M. Curie. The police immediately sent to his address, and soon afterwards the body was identified and conveyed to his home.

Although radium was exhibited at the Paris Exposition of 1900, it was some time later that the names of M. and Mme. Curie became household words, and honours did not pour in on them until 1903.

The characteristic modesty of the famous chemist was then exhibited when he refused the ribbon of the Legion of Honour, among other reasons, it was said, because it was not offered to his wife. When urged to become a candidate for the Académie des Sciences, he walked, in the phrase of a Paris journalist, "towards glory with the *entrain* of a whipped cat," and so gracefully enlarged on the merits of a rival that the rival was elected in his stead.

Both M. Curie and his wife came of families in which science ran in the blood. He was directing a municipal laboratory when she came from Poland to pursue her chemical studies. Mlle. Sklodowska became his assistant, and when in 1895 he was made Professor of the Paris Municipal School of Physics and Chemistry their marriage followed. Their little daughter was the professor's pet.

The idea of the discovery of radium belongs to Mme. Curie. She first isolated polonium—named after Poland—from uranium, but the cost of the researches almost robbed the household of the necessities of life. Many months later radium was separated from barium, extracted from many tons of pitchblende. Meantime M. Curie had also become a professor at the Normal School at Sèvres.

Professor Curie's tall, spare, and unassuming figure was several times seen at scientific meetings in England. In 1903 he lectured before the Royal Institution, and later received for himself and his wife the Davy Medal. Then came the award of the Nobel Prize of £4,000 between the Curies and M. Becquerel, from whose work on radio-activity the investigations started, and of the Osiris Prize of £2,400 to Mme. Curie.

The late professor was only forty-three.

(*Daily Mail.*)

Personal.

THE terrible earthquake and fire in San Francisco will bring to the minds of the London College graduates of 1894 the name of one of the most earnest students of that year, Mr. Isaac W. O'Rourke, a young Californian, who returned after very successfully obtaining the Membership of the Royal College of Veterinary Surgeons, to America, and started in practice at 331, Golden Gate Avenue, San Francisco. His friends in England will condole with him in his misfortune, and trust that he has been one of those whose losses will, at all events, not be irreparable.

DR. O. CHARNOCK BRADLEY, M.D., C.M., D.Sc., M.R.C.V.S., F.R.S.E., Professor of Anatomy in the Royal Veterinary College, Edinburgh, has been appointed one of the external examiners for the B.Sc. Degree in Veterinary Science in the University of London.

M. SUFFRAN has recently been elected to the professorship of comparative pathology in the Toulouse Veterinary School.

M. ZWANEFOEL has recently been appointed Professor of Zootechnie in the Veterinary School at Curgheim, Brussels.

BY a decree of the President of the French Republic, dated February 7, 1906, the following nomination to the grade of Chevalier of the Legion of Honour has been made: M. Foin, 2nd class Veterinary Surgeon, 37th Regiment Artillery, thirty-seven years' service. Two campaigns.

A COMMITTEE under the presidency of Dr. Lothes has been formed to erect a monument to the late Professor Dieckerhoff. It will be of Swedish granite, supporting a bronze bust of the late professor, somewhat larger than life-size, and will be erected in the park of the Berlin Veterinary School. It is hoped that the unveiling ceremony will take in June, 1906.

COLONEL NUNN, C.I.E., D.S.O., F.R.C.V.S., F.R.G.S., F.R.S.E., Principal Veterinary Officer of the Army Veterinary Corps in South Africa, Barrister-at-Law, has been admitted as an Advocate before the Bar of the Supreme Court of the Transvaal, Pretoria.

Reviews.

ON PROFESSIONAL EDUCATION. By T. Clifford Allbutt. London: Macmillan and Co. 1906. Pp. 80. 2s.

If, as has been stated, progress depends upon seeing beyond where we stand, then progress in matters educational is assured. For many are they who ask us to look beyond the present condition of education towards the dawn of reformation. And among these no better director could be found than the cultured Cambridge Professor, Dr. T. Clifford Allbutt, whose little book on professional education—small in size, but great in value—has recently appeared.

The book, as now published, is based upon an address delivered at King's College, London, on October 3, 1905, and, therefore, deals more particularly with professional education as applied to medicine. Medical and veterinary education having practically the same end in view, the address naturally contains much of interest and importance to those who are concerned with the education of the veterinary student, and should be read by, at least, all veterinary teachers and all members of the Council of the Royal College of Veterinary Surgeons.

Time was when, among veterinarians, much was heard concerning men of "practice" and men of "theory." This time is not yet past, but the comparison of men after the two categories is, perhaps, not so common as formerly. What exactly was meant by a "practical" man was never made very clear. It was, however, very evident that a "theoretical" man was generally considered to be a harmless sort of lunatic, possessed of much useless knowledge but in no way fitted to take his own part in the struggle for existence, and eminently incapable of rendering a good account of himself in his combat with disease. This much, at least, could be gathered from the tone in which reference was, and still sometimes is, made to the "theoretical" man. If by the term was meant one possessed of knowledge—if the term may be allowed—derived solely from books, then the scornful tone was certainly correct. If, however, he differed from the "practical" man only in refusing to follow a rule-of-thumb line of practice, and insisted instead in knowing something of fundamental laws and so-called theories, then he assuredly was one deserving, not scorn, but praise. "Practice," *i.e.*, the application of knowledge, cannot be separated from "theory." A chemist who has never made an experiment; an anatomist who has never handled the knife; a pathologist who has never investigated pathological phenomena for himself—these are as unthinkable as a fish which has never been near water.

In the minds of some, even now, the term "theory" means something, if not despicable, at best merely ornamental. In the same minds nothing but "facts" are held of value. Now, in reality facts are useless as facts; or, as our author expresses it, "until it is built into theory or idea a fact is of no more use than a brick—to be wasted on a passing stranger. By ideas it is that men lead, nations prosper, and dominions are established; by ideas dynasties are overthrown, nations convulsed, and peoples scattered; by them the tyranny of custom and the dogmas of schools are broken up; by them we interpret, we work, and we prophesy." It almost seems as though the "man of theory"—if the term be employed in its proper sense, and not as meaning one who has seen things only through the eyes of others—is of more moment

than the "practical man"—if by this we mean one devoid of theory. "The man whose mind has been built up on universal lines, whatsoever his calling, is enabled to free himself from the conventions and temporary notions of the mere 'practical man,' to distinguish the important from the unimportant truths, and to drop swiftly upon cardinal features—upon the facts which matter."

That reforms are imperative in both medical and veterinary education is obvious. Professor Allbutt evidently wishes to see the medical curriculum lengthened, five years being all too short a time in which to acquire a satisfactory grasp of the multitude of necessary subjects. "No wonder," he says, "at the development of coaching—that is, not of making men, but of stuffing them; no wonder at the stream of cram-books pouring from the printing offices; no wonder at the 'window dressings' for examination; our wonder we will keep for the young men who, under such a drill, come out of it with any freshness of mind left, and with any better mental furniture than trite professional formulas." Something in a similar strain might be said of the veterinary curriculum. In both curricula, either the time is too short or the subjects too many. Professor Allbutt is of opinion that "in the summary education for a diploma we have been moving on the wrong tack, and moving away from stouter and truer methods of two generations ago." (He is, of course, speaking of medicine only; but the words are likely to become prophetic for veterinary education also.) "For two generations we have been loading and loading this brief curriculum as if our ambition were to teach many things ill rather than a few things well. And we have seen how one may spend a lifetime on many acquirements, and yet be uneducated. Our forefathers thought, and I agree with them, that the backbone of medical education is anatomy, that the right way to educate is to teach a few subjects broadly and deeply, and that the way to build is to begin with the backbone. Young men love to do something with their fingers, and their instinct is a true one. Finger-work does more than add itself to thought and memory, it multiplies them. . . . As an initial training anatomy is better suited to youth than the more abstract principles of chemistry and physics; and as modern research is integrating physiology more and more with anatomy, so structure and function—two aspects of one subject-matter—are becoming more and more associated, to the advantage and enlightenment of the student. . . . In his first two years the student who only seeks a diploma should make his own a knowledge of anatomy and physiology as broad and thorough as university professors and university methods can make it; a discipline to be broken into as little as possible by intercurrent diversions. The elements of physics the student should bring with him from school."

Our author, in his desire to clear the curriculum as much as possible, would exclude chemistry as it is at present taught. "I agree with Sir William Ramsay that this is not a good subject for boys; nor, indeed, in the course for a diploma has it proved possible to teach chemistry on the scale of a pure science, to teach it comprehensively for its own sake, and as mental training. In a five years' course it is, and perhaps can only be, taught as a technical department—introduced, that is to say, partially and incidentally as immediate utility requires, and not as an education; but after this

manner, as pharmaceutical chemistry, as physiological chemistry, as an instrument of clinical diagnosis, and so forth, it should accompany the paramount and thorough training in anatomy and physiology, and be carried forward, as now it scarcely is, with the whole course of medical instruction. . . . . Under present methods the first-year student fags up some rule-of-thumb chemistry with no great mental or scientific advantage, and on no comprehensive scale; and when his first examination is over he is apt to dismiss the subject from his mind; receptiveness has its limits, and the ship must be lightened. This kind of education is not edifying; so the more reason that at least anatomy and physiology should be taught scientifically and for their own sakes—taught, that is, on university methods, taught as education for universal as well as for technical ends."

These quotations deserve to be set forth at length, on account of the great truths they contain. No one familiar with the student mind will be prepared to declare that they disclose either more or less than the actual present condition of affairs.

At what period of the curriculum should the student commence his clinical work? On this question opinions are divided. There are those who hold that a young man is all the better for having "seen practice" before entering college, and that he should see as many "cases" as possible and whenever possible. Those who support this view are not, as a rule, teachers. Teachers, in the main, are convinced that those who have "seen practice" before entering a college are prone to consider the preliminary scientific training as so much time lost. It is much better that clinical work should wait until a sound scientific foundation has been laid. There is then much less risk of the production of empirics. Professor Allbutt is of opinion that "the university medical student does well to postpone serious work in a hospital until he has mastered his scientific subjects, up to pharmacology and general pathology. The professors of the institutes of medicine are, I think, all agreed that the best men have been those who, up to the age of twenty-two or twenty-three, have pursued an unbroken university career."

The question of apprenticeship naturally arises in this connection. "For my own part, while I admit how much the young diplomé or graduate has to learn in the way of tact and little adroitnesses in the management of private patients, in the conduct of trivial or tedious disorders which do not find their way into hospitals, in the dispensing of medicines, and so forth; yet surely to revive the bond of apprenticeship for these minor accomplishments is to burn a house for roast pig. Manual dexterity, it is true, can be gained only in early life, but this would come with the earlier application to anatomy, which I advocate. The apprentice did not always get the best or most conscientious of masters; in any case he was liable to be infected at a critical time of his life, and too often was infected, with an incurable empiricism, and became habituated to a narrow routine . . . I agree that six months' occupation with an able and intelligent family physician would prove an invaluable finish to hospital instruction. But I think that such residence should be with masters registered for their special fitness by the General Medical Council." The last two sentences are respectfully recommended to the careful notice of those who would make the apprenticeship of veterinary students compulsory.

That the little work at present under consideration teems with good things, things wise, of liberal outloook, and of root in experience, will be obvious from the above quotations. So many are the opinions which are worthy of careful examination by all those who have the interests of veterinary education at heart, that it is only possible within reasonable space to give scanty and inadequate samples. In conclusion, it may be well, in view of present movements in veterinary education, to give Professor Allbutt's views on university degrees, and the multiplicity of channels by which the aspirant may enter the medical profession. He is of opinion that degrees should be granted by universities to those who desire not necessarily a qualification to practise, but "a training of the mind, a formation of habits of study, of insight, of easy handling of ideas, and of methodical research, whether by the principles of the future profession, or of any other department of knowledge. . . . . The universities of the United Kingdom step out of their function when they undertake, as they do, to issue with their degrees in medicine a licence to practise. In my own university the M.D. degree is often bestowed, and is properly bestowed, on persons who never intend to practise medicine, and who would be embarassed if in any emergency they were called upon for this office. Nor should it be any specific concern of the university how well or how ill its graduates may practise medicine; all that the university should be responsible for is that its graduates should have a certain development of mind and imagination." To attain a legal qualification to practise there should be one portal, and one portal only—and that should be a modification of the State portal which obtains on the Continent. Surely if the quality of the men who become medical practitioners and veterinary surgeons affects the State, it is the duty of the State to busy itself in the admission of men to the legal qualification to practise medicine or veterinary science.

C. B.

Manual of Veterinary Sanitary Police. By Dr. Alfred Minardi. Published by U. Hoepli, Milan, 1905. Price 2s. 6d.

The firm of publishers, Messrs. U. Hoepli and Co., make a speciality of scientific pocket manuals, and have published about eight hundred on various subjects. This book is divided into three parts. The first comprises six chapters describing contagious diseases, the general sanitary measures (notification, visit, declaration of infection, isolation, suspension of movement, slaughter, &c.), the sanitary police at the frontiers of land and sea, sanitary measures relative to the movement of animals, service of the veterinary police and general arrangements. The Italian veterinary service does not seem to be as perfect as that of other countries. The second part embraces special measures for each of the contagious diseases. The third part is devoted to sanitary law. The author commences by describing briefly that of the different European States, then follows that governing Italy, specially giving all the rules, decrees, circulars, ordinances, and instructions which are in force. This little work is well edited and very useful, not only for our Italian *confrères*, who have to carry out these instructions, but also for us in making ourselves acquainted with all that governs the sanitary police in Italy, which is, however, still far from attaining the degree of perfection we can boast of.

T. Marriott, Major, A.V.C.

Translations and Extracts.

CRETINISM IN DOGS.

At the "Gesellschaft," Vienna, March 2, 1906, Wagner presented a dog with all the symptoms of endemic cretinism. The dog came from Weiskirchen, in Styria. The head was small, with thick bones and hypertrophy of the soft structures, more particularly those of the face. The legs were heavy, thick, and short, and moved with an awkward apathetic gait.

Wagner thought this an important subject for investigation among animals, as it may account in many cases for the endemic production of this disease in the human species. Several years ago, in conjunction with Schlagenhaufer, he commenced to investigate this subject, as he suspected such an origin, but their labours ended in disappointment at that time. Since then many obscure suspicions have been confirmed, and this pathological anomaly in dogs may lead to a revelation in the origin of cretinism.

Pupovac remarked that he was rather sceptical about the cretinism of dogs producing endemic cretinism in the human race. He recollected a gentleman in Admont who had a dog that gave birth to five young, three of which were cretinic, the other two feeble. All were fed on thyroid gland, with the result that the three cretinic became strong and healthy, but the other two which were at first supposed to be only weak, and not affected, died.

Alexander gave a brief description of the anatomical defects in the hearing of the cretinous animal and particularly dogs. The defective perception of high tones, while moderate and deep tones can be heard, proclaims a lesion of the internal apparatus, probably the labyrinth, or acoustic nerve, either extra- or intra-cerebral. After locaising this lesion he confined himself to the division of the pathological changes met with in the human subject. These, he thought, might be divided into three classes or groups, according to their characteristics. The first group comprehended tubal catarrh, which affected the echo of resonance of sound. This morbid change in hearing is often produced by hypertrophy of lymphoid tissue of the pharynx in the form of adenoid vegetations. This group of changes is greatly improved by a course of thyroid treatment—the catarrh disappearing and the hearing more acute.

The second group is composed of the cretinic deaf and dumb, resembling the congenital form of deafness, having no pathological centre in the anatomy marked out as the cause of deafness.

The third group includes cases not so severe as to prevent testing of the physical power of hearing, although this function is performed with difficulty. In cretins, this group recovers rapidly in hearing under the influence of the thyroid gland, just as the internal cases do. There is no doubt of the defective hearing in cretins, but the difficulty is intensified when we attempt to determine the degree, as the intelligence is low and no reliable data can be deduced from the tuning-fork test, therefore no exact diagnosis can be obtained in these cases.

Hammerschlag repeated the results of Eberth's research on calves which were also affected by cretinism. He also quoted Habermann's

conclusions that all cretins were defective in the perception of sound as recorded by his apparatus.

Wagner remarked that Eberth's and Habermann's cases were those of chondro-dystrophia, which in no way could be allied with cretinism, but was more probably a sort of micromyelia in the adult.

(*Medical Press.*)

EPIZOOTIC MUCO-PURULENT CONJUNCTIVITIS IN GOATS.

A. DELMER.

THE first symptoms are swelling of the eyelids, with injection and infiltration of the conjunctiva. The discharge is of a yellow colour and forms crusts on the side of the face of a greyish tint. In certain cases there was inflammation of the cornea, and in others the discharge became chronic, but the general conditions were not affected.

The disease was highly contagious, and in a few days the whole flock was attacked. The disease appeared to spread by cohabitation as well as by direct contagion, but only in goats.

Mild cases recovered without treatment, and even in acute ones bathing the eye with warm boracic lotion, with an instillation of a 2 per cent. solution of nitrate of silver, followed at once with salt solution, was successful.

(*Revue de Médecine Vétérinaire.*)

INFECTIOUS EPIDIDYMITIS IN THE HORSE.

VALLEE, JESUER AND SAVERGNE.

EIGHT stallions out of thirty-four were suddenly attacked with unilateral orchitis, and six were castrated. The seat of the disease was in the epididymis, which was infiltrated with a greenish-yellow pus. In some cases there was sloughing, which extended to the sheath. In three cases the testicle itself was implicated; in one the gland had mortified, and contained a sequestrum the size of a child's hand.

The authors detected a small bacillus, but it had nothing in common with glanders. The Mallein test was used without any reaction.

(*Bulletin de la Société Centrale de Médecine Vétérinaire.*)

CONTAGIOUS ENTERITIS IN YOUNG PIGS.

MAZZINI AND AGOZZI.

THE disease is prevalent in most parts of Italy, and is known by the term "calcino."

The symptoms usually come on the third or fourth day after birth, very rarely after the thirteenth. The incubation period is from four to five days, sometimes as short as forty-eight hours. The earliest

symptom is the passing of hard, white fæces, resembling chalk (hence the term "calcino"), which gradually become fluid, turning a yellow or a greenish-yellow colour, with a fœtid smell.

The young pig grunts as if in pain, and rapidly loses flesh; the temperature at first rises and then falls below the normal, and in most cases the pigs which live always remain in bad condition, with an enlarged abdomen,

On *post-mortem* examination the intestines were studded over with small hæmorrhagic spots, which contained a soft, granular, yellow material, the living mucus membrane was thickened, and Peyer's patches congested and sometimes ulcerated. The liver and spleen were enlarged, and the kidneys dark red in the cortex; the mesenteric blood-vessels were dilated. The heart was enlarged, the walls friable and the meninges of the brain congested.

The authors isolated a micro-organism, much resembling Lignières *Pasteurella*, from the blood and various organs, and this infected young pigs when inoculated subcutaneously. The rabbit is more sensitive than the guinea-pig.

The disease is easily distinguished from hog cholera by its clinical appearance and lesions. Hog cholera usually attacks young pigs two months old, but contagious enteritis attacks them directly after birth. In swine plague the lesions exist in both the intestines and the lungs; in contagious enteritis they are confined to the intestines. The organism is smaller than that of hog cholera.

The mortality is high, but some cases apparently recovered by the aid of 1 per cent. carbolic acid.

(*Archena Scientifico della Reale Soc. ed Accad. Veterinaria Italiana.*)

CANINE DISTEMPER.

BY M. CARRE.

In a former paper on the subject (Carre, "Etude le Maladie des Chiens," *Revue Générale de Médecine Vétérinaire*," 1905, vol. vi., page 321) the author has shown that the severe discharge at the commencement of the disease is virulent from an invisible organism that can pass through a porcelain filter. In this paper he points out the importance of certain lesions seen in dogs which have died of the disease (both naturally and artificially acquired), the virulency of certain discharges, the etiological and symptomatic value of the pustular eruptions, and the relationship between canine distemper and aphthous fever.

Two drops of the serous discharge from a young dog caused high fever. On the second or third day the animal became dull and sullen, refused food, lay down moaning, and died in a state of coma about the sixth or seventh day. The only visible lesion was a small amount of clear yellow fluid in the pericardium. This fluid, which was sterile, was virulent with clean dogs, the lesions being reproduced.

Small doses of filtered discharge of pericardial fluid gave rise to the

classical disease, death taking place between fifteen and twenty-one days. There were the usual pulmonary and pleural lesions. In addition there were hæmorrhagic and ill-defined yellow patches on the heart. There was a certain quantity of fluid in the pericardium, but it was not virulent. The same appearances existed in the naturally acquired disease, but the pericardial fluid was only virulent in the sub-acute forms.

In those cases of artificial infection in which the evolution of the disease was rapid a micrococcus was found in the blood resembling that obtained from the cutaneous pustules. The author does not think this eruption is a specific symptom of distemper. Inoculation with aphthous virus causes an eruption clinically and bacteriologically identical, and both may appear on the same day. In aphthæ in pigs there are similar lesions to those of distemper, and the virus appears to be nearly identical.

(*Bulletin de la Société Centrale de Médecine Vétérinaire.*)

MAMMITIS IN COWS.

BY PROFESSOR BRUIN (UTRECHT).

THE paper is divided into three parts, dealing respectively with the anatomy, histology and physiology of the udder, inflammation of the gland, and complications, diagnosis, treatment and prophylaxis.

He considers that there can be no doubt but that mammitis is caused by micro-organisms which gain access through the teats and which are found both in the gravel and the earth from the floors. It is, however, difficult to directly demonstrate their pathogenic *rôle*, and Hess and Guillebeau have shown that the injection of certain well-known pathogenic organisms into the gland, such as *Streptococcus mastitidis*, will not give rise to mammitis. From this it must be concluded that there must be other predisposing causes, such as an accumulation of milk in the sinuses, an injury to the gland, such as a bruise from lying down or from a kick, errors in feeding, chill, &c.

(*a*) The first class of mammitis is due to bacilli such as *Bacillus coli*, *Bacterium phlagmasiæ*, and the A., B., and C. varieties of Guillebeau's bacillus. Most of these are short rods, 0·5 to 2 μ in length, which grow in various forms on gelatine and agar.

(*b*) The second class is caused by streptococci, and is characterised by an acute catarrhal mammitis of one or more of the quarters, in some cases accompanied with abscesses and interstitial inflammation.

The milk is yellowish or white in colour, and flocculent, and when centrifuged, the streptococcii can be discovered. These organisms exist as saprophytes in the mucus of the vagina and excrements, and gain access to the sinuses through the teats, the contagion being spread by the hands of the milkers, also from the latter through the objectionable practice of milking the diseased quarter on to the ground.

The streptococcii are not very virulent, and subcutaneous inoculation causes no local disturbance.

The disease is most commonly seen in newly calved cows, in which the purulent catarrh is more severe, swelling more marked, and febrile symptoms more intense than if the animal is not attacked till later on. In the latter there is often nothing seen beyond slight disturbance in the secretion of the milk.

As a rule one of the quarters is lost, and according to Zschokke, the long streptococci cause more serious results than the short ones.

(*c*) Tubercular mammitis is a special form. It can be detected by bacteriological examination, controlled by the inoculation of guinea-pigs.

Among the complications that may arise Bruin notices general disturbance from toxins elaborated—abscesses, necrosis, sclerosis and metastatic arthritis, especially of the hock joint, and with regard to this, Roels remarks that the streptococci are never found in the fluid from it.

The preventive measures recommended are:—

(1) Clean fresh bedding, or, better still, peat moss or fine sea sand.

(2) Tie up the tail so that it is not fouled by the droppings.

(3) Carefully wash and disinfect the hind quarters and udder after calving.

(4) Dry the udder with a clean towel; wash the hands with warm soap and water, and apply some vaseline to them before milking.

(5) Isolate cows affected with retention of the membranes, leucorrhœa, or mammitis, from the others.

(6) Diseased cows should never be milked on the ground. A special bucket should be kept for them, and they should be milked into a disinfectant.

(7) The use of milk syphons should be strictly prevented; they are a fruitful source of infection.

Treatment is both local and general, and the lines are to eliminate the toxins by the kidney and bowel. Cream of tartar with sulphate of soda is highly recommended, also salol and turpentine in large doses where gangrene is threatened. Van Itallie's experiments (vide *Revue Générale* of July 15, 1905, vol. vi., page 87), however, show that there is but little direct action from drugs eliminated through the mammæ. Antiseptic injections are not recommended. Guillebeau and Hass, also Zschokke and Kitt, show that they do not penetrate beyond the larger canals. If any are used, boracic acid 1 to 2 per cent., or physiological salt solution 9 per 1,000, are preferable, as strong antiseptics have a deleterious affect on the delicate epithelium of the gland.

The udder should be milked every two hours, and if there is danger of gangrene setting in, the insufflation of oxygen had recourse to, 1 to 1½ litres of gas to each quarter. The author has given up using liniments and ointments, but strongly recommends simple massage, especially if there is great hyperæsthesia or gangrene, and if there is an accumulation of putrid material in the sinus, he opens it at the base of the teat large enough to allow of the passage of the finger.

(*Schweizer Archiv. für Tierheilkunde.*)

NAVICULAR DISEASE.

BY M. PECUS, VETERINAIRE EN 1ER DRAGOONS.

WHAT is navicular disease? It is defined by MM. Cadiot and Almy ("Traite de thérapeutique chirugicale des animaux domestiques") as synovitis of the navicular joint complicated with osteitis and inflammation of the tendon. M. C. Lesbre ("Un cas de maladie naviculaire; Considerations géneralés sur l'anatomie, pathologique, et la pathogenie de cette affection," *Journal de Lyon*, 1897, page 325), osteitis of the navicular bone, resulting from concussion to the perforans tendon where it passes over it. M. Magnin ("Quelques autopsies d'arthritis naviculaires du cheval," *Recueil de Médecine Vétérinaire*, 1895, page 214; 1896, page 293; 1897, page 691; 1898, pages 27, 300 and 428; 1899, page 20; *Bulletin de la Société Centrale de Médecine Vétérinaire*, 1900, page 777), osteitis of the navicular bone, accompanied with ulceration of the cartilage and tendon, and synovitis. MM. Jacoulet and Joly (G. Joly, "Etudes Cliniques," 1899; Jacoulet, "De la neurotomie en thérapeutique chirurgicale," *Bulletin de la Société Centrale de Médecine Vétérinaire*, 1906, page 777), as osteitis of work. M. Pecus ("Etudes sur la maladie naviculaire; troubles, vasculaires et nerveux, dans un case de maladie naviculaire double; osteitis et tenositis," *Société des Sciences Vétérinaires de Lyon*, 1901, page 146; "La maladie naviculaire n'est qu'un, symptome de l'arthrite séche," *Recueil de Mémoires et Observations sur l'Hygiene et la Médecine Vétérinaires Militaires*, 1904, vol. v., page 552), that it is a system of dry arthritis. This shows that there is a diversity of opinion on the disease, which was first noticed about the beginning of the 19th century. The question therefore arises, what is the true etiology? In turn, conformation of the foot, defective bone, rheumatism, influenza, pneumonia, and various infectious diseases, work, and breed have all been incriminated.

In 1806, Turner remarked that light, well-bred horses used for quick work were more subject than any others; and nowadays the disease appears to be on the increase, possibly because, by the use of local anæsthetics, it is more accurately diagnosed. Furthermore, it is seen in both light and heavy horses.

M. Joly points out that there is a tendency to attribute all lameness that occurs below the knee to navicular disease, and thinks that a number of these so-called cases are in reality phalangeal osteitis ("La maladie naviculaire," *Revue Générale de Médecine Vétérinaire*, vol. i., 1903, page 618). There is, no doubt, great difficulty in diagnosing cases, particularly in the earlier stages, and this is increased by the want of *post-mortem* evidence.

It is also open to question whether the changes which take place in the bone alone constitute navicular disease, and this will be proved not to be the case, but that there are vascular and nervous lesions, both peripheric and central, which clearly indicate general infection. The subjects from which the specimens were obtained were young Anglo-Normans, that have done little or no work, and in which there could not possibly be any senile change.

The following observations go to prove that the navicular bone is affected with non-suppurating chronic osteomyelitis, and at the same time the joint and perforans tendon with dry tenosynovitis. In the *post-mortem* examinations which have been made other joints have been

found effected with dry arthritis when carefully looked for. The same fact has been noticed by MM. Joly and Cadéac ("Sur les accidents consécutifes a la neurotomie," *Bulletin de la Société des Sciences Vétérinaires de Lyon*, 1903, page 230).

Case 1.—Purchased at 6 years old, destroyed for a fracture of the off humerus at 12. Navicular disease off fore. Dry polyarthritis. Fungoid endocarditis on the left side of the heart.

The animal was 12 years old in 1893, and had no case of internal disease recorded against him. He had been admitted four times to the infirmary in 1892 for rheumatism in the off fore limb. The fracture took place in the riding school when jumping in 1893.

Post Mortem.—There were a few small organised fibrous nodules on the liver and small intestine. The left auriculo-ventricular valves were thickened, and there was well-marked granular endocarditis on the sigmoid valves of the aorta. There were the usual appearances on the navicular bone. The tendon was adherent to the capsule. The metacarpo-phalangeal articular cartilages were very thin, and the large sesamoidal annular ligament covered with a thick reddish-yellow exudate. The scapulo-humeral and humero-radial articulations were in a state of chronic inflammation, with denudation of the cartilage in patches.

The articular cartilage of the glenoid cavity of the scapula was discoloured, and that on the head of the humerus ulcerated. There was dry arthritis in almost all the articulations of the off fore limb, well-marked endocarditis on the right side of the heart, and traces of former peritonitis, probably due to strangles.

Case 2.—Purchased at 5 years of age, died at 11 from double pulmonary congestion. Navicular disease in both fore feet, and symmetrical dry arthritis in both knees. Neurotomy had been performed on the off fore.

The patient was 11 years old in 1898, and there was no record of any internal disease. In 1895 high plantar neurotomy was performed on both sides of the off fore limb. She worked up to July 19, 1898, when she died from double pulmonary congestion.

Post Mortem.—There were the ordinary appearances of navicular disease in both fore feet, which were more marked in the off one, on which the operation had been performed. The cartilage on the lower surface of the navicular bone was abraded and red, with a number of granulations on it.

The right plantar aponeurosis was lacerated on the anterior surface, a tuft of fibres floating free in the joint; the capsule was inflamed, and filled with pink-coloured synovia.

The cartilage at the head of the metacarpal bones was ulcerated along the anterior border, and there was a corresponding ulcer on the superior surface of the lower row of small bones of the knee. These ulcerations were identical in both limbs.

The cartilages of the pastern joint were thickened and covered over with yellow granulations. The joint was filled with turbid synovia containing a number of yellow fibrinous clots varying from the size of a pea to a hemp seed. They were particularly numerous in the off limb.

The cartilage on the lower extremities of the metacarpal bones were grooved, as is the case in dry arthritis, in the direction of movement of

the joint. On the upper extremities of the pastern bones there were large ulcerated patches to the right of the median groove and others round the anterior border of the articular surface. The articular surface of the sesamoids was grooved in the same manner, and on the internal one of the near fore limb there was an ulcerated patch.

The bone below the patches of ulceration on the head of the large pastern was dark red in colour, with a number of small rounded exostoses of a white colour projecting from it. The lesions were the same on both limbs, but if anything more marked on the left.

There were white-coloured osteophytes, about the size of a millet seed, on the articular surface of the os pedis, in the internal glenoid cavity. The suspensory ligaments, the flexor tendons, and the sesamoid ligaments were all inflamed.

This case proves that not only is navicular disease accompanied with polyarticular lesions that are symmetrical, but that these lesions would not be affected by neurectomy. M. Cadéac expresses the same opinion regarding a *post mortem* made on a horse that had been unnerved, and in which he found trophic lesions above the seat of the operation (*Bulletin de la Soc. des Sciences Vét. de Lyon*, 1903, page 220).

Case 3.—Purchased at 6 years of age; destroyed at 8, for laminitis and navicular disease. Myelitis and encephalitis. Dry arthritis in all four limbs. The horse was bought in 1897 at 6 years of age, and went lame almost at once. The case was obscure, but it was put down to rheumatism, and the animal could only do very light work.

One June 6, 1898, he was exceedingly lame on the off fore fetlock, but this disappeared on the eighth day. On July 2 a large articular and tendinous wind-gall suddenly appeared without any reason, "as the horse was only being exercised," on the near fore fetlock. While being exercised in hand, he, on three separate occasions, nearly fell on his head, which gave rise to suspicions of some brain affection. On July 19 he again nearly came down at exercise, and was brought back to the stable suffering from slight colicky pains. The same thing occurred later in the day, the respirations being somewhat rapid. He was bled, a blister applied to the abdomen, and pilocarpine given. Iodide of potassium was prescribed. He continued much in the same condition on the 20th and 21st, the spasms being intermittent. On the evening of the 21st he was noticed to be slightly paralysed in the hind quarters, from which he recovered on August 2, at the same time he became very lame on the near hind, which was attributed to rheumatism. He became very lame on the off, and somewhat so on the near fore. Salicylate of soda was prescribed.

On the 24th he stood something like a horse with laminitis, except that the feet were not hot, and that he went on his toes, not his heels. These symptoms, which are looked upon as diagnostic between navicular disease and laminitis, have already been noticed by M. Prevost, of Besancon, in equine typhoid fever (influenza) with articular lesions (*Bulletin de la Soc. des Sciences de Lyons*, 1898, page 37).

On July 26 the fore limbs below the knee were swollen, and the sheaths of the tendons distended, and remained so until August 2, the appetite continuing good. From August 2 to 8 there was considerable improvement, the animal moving comparatively well, but on the latter date the limbs again became œdematous, the patient dull and depressed,

hanging his head in the corner of his box, and not taking any notice of his surroundings. He had difficulty in standing, and there was marked emaciation of the hind quarters. When down he rose with difficulty, and became covered with bedsores. As the case was hopeless, he was destroyed on September 17.

Post Mortem.—Heart hypertrophied, both the aortic and pulmonary valves were very thin and denticulated on the edges. The lining membrane of the anterior aorta was roughened, and in the posterior there was a small circular patch of granulations, about 10 centimetres from its origin. There were signs of laminitis in all four feet, more in front than behind. There was a nodule of sclerotic tissue, the size of a small nut, in the grey substance of the left hemisphere of the brain, at the anterior part, which, on section, showed numerous white spots, varying from the size of a pin's head to that of a bean. The right hemisphere was quite healthy.

The cerebellum and medulla were healthy, but there was an abnormal quantity of fluid in the spinal canal, of a slightly pink colour. Between the lower horns of the grey matter on the right side in the lumbar region were a number of white patches, and on section, the grey matter had the form of an irregular-shaped letter H.

Articular Lesions.—Fore limbs: In addition to the lower face of the navicular bone being studded over with small miliary osteophytes that deformed the medium ridge, there were other lesions in the different articulations.

(*a*) Osteophytes were found in the glenoid cavity of the left scapula, the head of the right humerus, the internal border of the antero-external glenoid cavity of the lower end of the right humerus, the antero-posterior ridge of the radius in the form of a cauliflower excresence, and on the margin of the internal oval cavity and the internal border of the sigmoid cavity of the right radius, the supra-internal border of the synovial cavity of the left cuboid bone, and the upper surface of the scaphoid.

(*b*) *Ulceration of the articular cartilages* was noticed on the internal condyles of the lower ends of both humeri and the middle trochlea of the right one, also on their upper ends. There was rarefied osteitis in both humeri, particularly in the left one. In both knee-joints there was ulceration on the anterior border of the upper surface of the semilunar bones, on the lower surface of the right scaphoid, and on the heads of the large metacarpal bones.

Hind limbs: There was a number of irregularities on the lower surface of the navicular bone. In both hocks the insertions of the interosseous ligaments between the scaphoid and cuneiform bones were ulcerated, also the articular cartilage. The left scaphoid and cuneiform bones were anchylosed along the external borders, but not on cartilaginous surface. The same condition was present in the lower row of small bones and the head of the metatarsal, with cartilaginous anchylosis on the near side. This case is an unusual one, as in addition to the navicular disease, there were polyarticular lesions on all four limbs from prior infection, as is proved by the valvular and aortic lesions, the cerebral sclerosis, and alterations in the medulla.

Case 4.—Purchased at 5 years of age; died at 11 from diaphragmatic hernia of the small intestine. Navicular disease in all four feet, with general dry arthritis.

The patient became lame from laminitis in the off fore foot in August, 1898, for which he was treated, and recovered.

On March 25, 1899, he become lame on the near fore from navicular disease. Neurotomy was performed on July 1, and he was used in the riding school during the year 1902. On January 20, 1903, he was admitted to the infirmary for a small wound in the off fore frog with engorgment of the limb. He was taken ill on January 23, and died in two hours.

Post Mortem.—Chest and abdomen : The bowels were normal, with the exception of about twenty feet of the small intestine, which had found its way into the chest through a double rupture in the diaphragm, and which was much congested. The chest contained about thirty litres of blood that came from the ruptured mesenteric vessels in connection with the hernia.

Articulations.—All four navicular bones were implicated, the near fore being the worst. This limb was the one that had been unnerved. The cartilage on the lower surface of the bone was roughened and covered with small horny growths. There were two small cavities extending into the cancellated tissue, one of which was open, the other covered with a thin transparent fibrous tissue. There were three elongated exostoses along the antero-inferior border. The lesions on the right navicular bone were much less well defined. On the hind ones there were only two oval patches of cartilaginous rarefaction, on each side of the median ridge. The left plantar aponeurosis on its anterior surface was of a yellow colour, the fibres torn and ragged, with the ends hanging loose in the capsule of the joint. The same existed on the right side, but in a lesser degree. In this case there were most interesting polyarticular lesions : the specimens were shown at a meeting of the Central Veterinary Medical Society, Paris, on April 23, 1903, *vide* pages 243 and 520 of the *Bulletin.*

Condition of the Cartilages.—The velvety and abraded condition was very pronounced, particularly on the heads of the femurs and median ridges which divide the condyles on the lower extremity of the metacarpal and metatarsal bones. This was specially noticeable on the right metacarpal and both metatarsals. The same condition was found on the lower articular surface of the near fore and hind metacarpal and metatarsal, and both fore small pastern bones, the heads of both humeri, and the ridges of both astragali.

The velvety condition was found in those articulations in which the ulceration was most advanced, especially the heads of the off metacarpal and near humerus.

On the internal condyle of the lower extremity of the right femur, the lower extremity of the left radius, and the glenoid cavity of the right scapula, there was, on the contrary, proliferation of the articular cartilage ; and on the inner edge of the inner trochlea of the right femur and the lower extremity of the right humerus there were fibroid growths floating in the capsule at one extremity, attached to the cartilage by the other.

On the upper extremity of both fore large pastern bones and the upper extremity of the near fore sesamoids there were well-marked ecchondroses.

The Synovial Membranes.—The synovial membranes were red, thickened, and covered with spongy villi. Nearly every joint, with

the exception of the left knee, was affected. The membranes in the true hock-joint were covered with small miliary tubercles, and there were a number of small pyriform bodies floating free in the cavity. The Haversian canals in the navicular, metacarpal, metatarsal, the humeri and tibia, were greatly congested, and the periosteum on the metacarpals and metatarsals hæmorrhagic.

It was most remarkable that, although there were such extensive lesions of the articulations, there were no exostoses, splints, spavins, &c., the limbs, in spite of the work that had been done, being as clean as those of a foal.

Case 5.—Aged 17. Acute navicular disease, with fracture of the bone and rupture of the plantar aponeurosis at its insertion. Dry polyarthritis. The patient, an Anglo-Norman mare, had done no work for a year. On July 31, 1902, navicular disease was diagnosed by means of a subcutaneous injection of cocaine. Median neurectomy was performed on October 28, and the animal went sound till November 22, when interphalangeal arthritis set in. The mare was destroyed on December 5, 1902.

Post Mortem.—The lesions in the near fore foot were those of ordinary navicular disease, with slight erosion of the plantar aponeurosis, but in the off fore foot there was extensive mischief, the whole of the structures, tendons, nerves and vessels, up to the fetlock, being encased in a thick lardaceous tissue.

The navicular bone was fractured, and in an advanced condition of rarefied osteitis, the cartilage on the lower surface being worn away, the surface rough and porous, and the interosseous ligament that separates the navicular from the pedal joint was entirely absent. The perforans tendon was intensely inflamed from the fetlock-joint downwards, and at the navicular bone there was no trace of it left.

The joint contained a small quantity of blood-stained synovia and fragments of bone. In the pedal bone, at the insertion of the perforans tendon, there was rarefying osteitis, and the external half, especially at the posterior portion, was partly absorbed.

The cartilage on the external condyle of the lower extremity of the small pastern bone was ulcerated. The same had taken place on the upper surface of the large one.

In this case the navicular disease was very advanced, and there were also lesions in the other articulations, especially on the upper surfaces of the first and third phalanges.

In all these cases there were symmetrical lesions in most of the joints and especially in connection with the sesamoid and navicular bones, much resembling those of dry arthritis or chronic rheumatism in man, viz., growing and velvety growths on the cartilage, ulceration with eburnation of the bone; underneath there were marginal ecchondrosis, and central osteophytes, growths on the synovial membrane, and abnormal development of the fringes.

Particular stress is laid on the presence of the radio-carpal, carpo-metacarpal, and interphalangeal articular lesions, which are always present in navicular disease, and all the evidence appears to show that this disease in the horse is only a symptom of a general condition resembling dry arthritis. This is not to be looked upon as a special disease, but as a special termination of all sorts of chronic arthritis caused by rheumatism, injury, or infection (Quénu, "Des arthro-

pathies, de l'arthrite séche ou deformante," " Traite de chirurgie," de Duplay et Reclus, vol. iii.).

Navicular disease is always accompanied with peripheric or central vasculo-nervous lesions.

Microscopic examination proves that, like dry arthritis in man, navicular disease in the horse is accompanied by vasculo-nervous lesions.

(1) *Arteries.*—The arteries were in all cases inflamed.

(*a*) CASE 3.—The off fore plantar artery was in part of its course slightly inflamed. Magnified 180 diameters, it was seen that the lesion was outside the internal elastic tunic between it and the contractile fibres, being a meso- not an endarteritis; under a higher power, that the inflamed part was invaded by proliferating connective tissue. The right artery was in a similar condition.

(*b*) CASE 4.—There was well-marked endarthritis in both the anterior and posterior arteries.

(2) *Veins.*—It is a curious fact that in the veins the inflammatory lesions are more pronounced than in the arteries. This has already been noticed by Nocard (" Accidents consécutifs a la neurotomie," *Soc. Cent.*, 1900, p. 373); and which have a strong resemblance to those seen in varicose veins in man (Ch. Remy, " Traite des varices des membres inferieurs et de leur traitement chirurgical "). The same condition of chronic phlebitis is seen in gouty arthritis.

(*a*) CASE 2.—In the digital vein in the off fore foot the muscular fibres were separated by infiltrated cellular tissue, being the commencement of endophlebitis, and the same condition was present in the collateral metacarpal. In the near fore the vein was surrounded by dense connective tissue which had encroached on its structure from without inwards.

(*b*) CASE 3.—In the vein of the off fore, in addition to the appearance of endophlebitis, there was a remarkable disappearance of the muscular fibres in certain places. They were wasted and separated from each other by connective tissue, out of which the entire wall of the vein was formed in one spot. The vein was surrounded by a mass of connective tissue, in which numerous minute vessels ramified, the appearance resembling the earlier stages of tuberculosis.

In some sections the muscular coat had entirely disappeared, being replaced by fibrous tissue. In the surrounding tissue were a number of small vessels that were themselves in a sclerotic condition.

As in varicose veins in man, the walls consisted only of connective tissue, without any trace of muscular fibres. At the point of section the off fore vein was normal, but the capillaries in the neighbourhood showed the lesions of phlebitis in all three coats.

(*c*) CASE 4.—In all four limbs there was sclerosis in the plantar veins in places, in others they were of normal aspect. In the hinder ones the lining membrane was thickened and composed of connective tissue.

(*d*) In a six-year-old mare that was destroyed for sloughing of the fore hoofs after neurotomy for navicular disease performed fourteen months previously, the condition of the plantar veins was very remarkable. The infiltration of connective tissue into the muscular coat was very exaggerated, and quite surrounded the fasciculi. At the same time there was endophlebitis, the walls being entirely composed of fibrous tissue.

The accompanying arterioles showed endarthritis, but the middle tunic was not completely destroyed.

(3) *Nerves.*—Where neurectomy had not been performed the plantar nerves were sclerotic, the primary fibres being separated from each other by fibrinous tissue rich in vessels, constituting perifascicular neuritis.

(4) *Spinal Cord.*—In a section of spinal cord from Case 3 the inferior fissure had disappeared, only a few traces being found in places, the lower lobes of the cord being united. This exists in locomotor ataxy in man.

The lesions in navicular disease in the horse allow of their being divided into two classes:—

(i.) Local, those implicating the navicular joint.

(ii.) General: (*a*) Polyarticular, resembling dry arthritis or chronic rheumatism; (*b*) vascular and nervous.

These are not only symmetrical in the fore limbs, but in old animals may be present in the hind ones also.

Etiology and Pathology.—After careful consideration of the anatomy and pathology of the parts, we are forced to look on the disease as a symptom of a general condition much resembling dry arthritis in man, both by reason of the polyarticular lesions in the cartilages and the way in which they are corroded; also from its slow development and being confined to one or two joints only. It differs from it, however, as there is no proliferation of the articular cartilages, and it is not specially confined to old horses.

It more resembles Garrod's rheumatoid arthritis, as it is polyarticular, symmetrical, and usually seen in the small joints, painful at the commencement, and increases by paroxysms. It differs, however, from it, in that it does not cause deformity of the limbs or loss of function. It is, however, impossible from a clinical, anatomical, or pathological standpoint to form a real distinction between the two diseases, and it appears to be one of that class mentioned by Charcot, which, having at first resembled dry arthritis, develop into typical rheumatism. In human medicine, amongst the different forms of dry arthritis, there is one of chronic osteomyelitis, which appears suddenly and has no tendency to suppurate, the same as in the navicular bone in navicular arthritis. On the other hand, if its identity with dry arthritis is admitted, it must be of a less severe form than Garrod's rheumatoid arthritis, and its relationship with chronic rheumatism is but problematic, as the hereditary rheumatism of Cornil, Trastour, and Charcot is only met with in one out of five cases.

Bouchard considers that the so-called progressive chronic rheumatism or dry arthritis is a wasting disease which has a certain analogy with some pathological condition of the joints of nervous origin, particularly tabes.

As will be seen, it is impossible to give an opinion on the nature of, or even classify, dry or deformative arthritis, which, in all probability, constitutes most of the diseases of the joints. The resulting lesions are not so much due to the arthritis as both the general and local state of the nutrition of the parts.

Navicular disease is frequently accompanied with arterio- and phlebo-sclerosis; indeed, it is the rule in adults. The following table gives the comparative symptoms between navicular disease and human dry arthritis.

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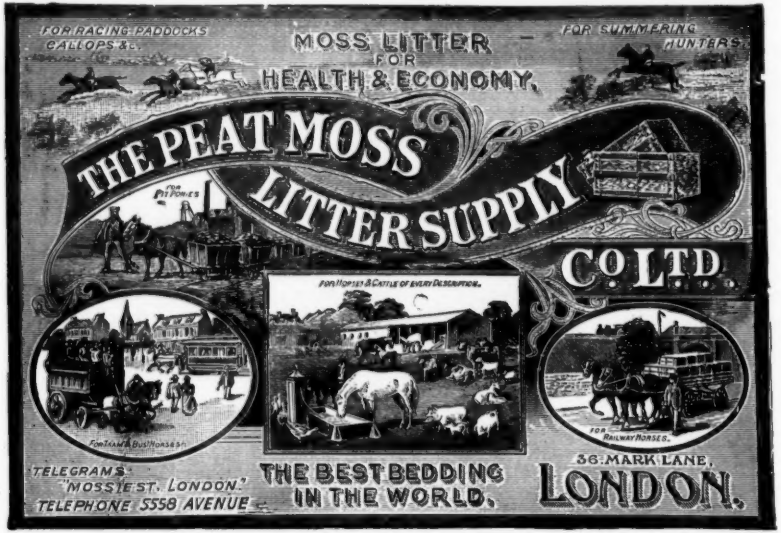
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The "COUNTY GENTLEMAN," *April* 1, says: "Chief among the merits of Peat Moss are the ease with which it is stored; the small danger it offers as regards fire compared with Straw; non-conductivity; the great powers of absorption; its antiseptic properties, and the ease and advantage with which it can be used as Manure in town gardens and in the country."

Navicular Disease.	Dry or Deformative Arthritis.
Definition.	*Definition.*
A disease of the foot of the horse, characterised by slowly progressive inflammation of the structures connected with the navicular joint, accompanied with nervous and vascular derangement, most commonly arterio- and phlebo-sclerosis.	The disease is the result of an inflammatory process, the essential characteristics of which are formative activity causing hypertrophic and atrophic lesions of the ligament, tendons, synovial membranes, cartilages, and bone structure, usually accompanied with arterio-and phlebo-sclerosis and structural alteration in the nerves.
Localised in the navicular joint.	Mono-articular.
Generally accompanied by lesions of the other joints below the hock and knee.	Is often accompanied by lesions in two, three, or four joints in symmetrical groups.
The deceased cartilages are striated, and there is rarefied osteitis of the navicular bone.	The cartilage is striated, with destructive inflammation.
The synovia is diminished or is totally absent, although during the height of the inflammatory process it may be present in an abnormal quantity.	Synovia diminished or totally absent, although during the height of the inflammatory process it may be present in an abnormal quantity.
Symmetrical.	Symmetrical.
Origin of the arthritis unknown.	Origin of the arthritis unknown.
Nutritive and trophic lesions in the whole navicular joint.	Trophic lesions from failure of nutrition.
The commencement of the attack is obscure. The limb is kept in a peculiar position, *i.e.*, "pointed," known in France as "Montre le chemin de Saint Jacques."	Commencement of the attack obscure; deformity of certain joints.
Pain of a temporary nature at the commencement, which is likely to be attributed to various causes, such as rheumatism, neuralgia, &c., without any general symptoms.	Temporary pain at the commencement, somewhat resembling rheumatism; non-febrile, and without any general symptoms,
Difficulty in moving on first coming out of the stable, but gets better when warmed up by exercise.	Difficulty in moving, but the pain disappears with exercise as the disease develop.
Stiffness when first moved, which does not increase with hard work.	Stiffness in first moving, which does not increase with work.
Impossibility of localising the pain in the foot by exploration, and there is no increase by passive movement.	Impossible to localise the pain by exploring the joint. It is not increased by movement.
The disease is chronic, and its progress is slow.	The disease is chronic, and its progress is slow.
The disease lasts for life.	The disease lasts for life.
Treatment of but little use.	Treatment of but little use.

There are, however, several differences between the two diseases in man and the horse, which can be accounted for by the difference in the skeleton of the quadruped and biped, as well as the different reaction in the tissues.

Man generally only performs a normal amount of work, and does not undergo very excessive physical exertion, as a rule. Light horses, at all events those in which navicular disease is most commonly seen, are constantly undergoing severe exertion, and an unnatural strain is thrown upon the heart vessels and articulations. The arterial pressure is increased; the alkalinity of the blood diminished; it is not properly assimilated, and auto-intoxication takes place. On the other hand, if man is less subject to excessive exertion, he is not protected by the laws of natural selection, and, in consequence, the race is likely to become weaker. In addition, alcoholism, lead poisoning, over-indulgence in food, syphilis, and tuberculosis, have to be taken into account. It also appears that man is more susceptible to disease of the bones than the domestic animals.

Dry arthritis is not a special disease, but a peculiar termination of chronic arthritis from whatever cause, and we should consider if the lesions seen in horses are not the result of a prior pathological condition. It would appear that the arthritic phlebitis and nervous lesions of young animals are the results of some prior condition that passes unperceived on account of their so frequently changing hands, but which leave traces in the shape of peritonitis, pleurisy, and which are only discovered on *post-mortem* examination.

There are but few horses that escape strangles, and in infectious diseases there is hardly any structure of the body that is not more or less implicated; and if certain cases apparently recover, in others the pathogenic agents leave traces of their ravages. Amongst others may be mentioned nephritis of scarlatina, phlebitis, endocarditis, arthritis of typhoid, diphtheria, rheumatism, pneumonia, influenza, and diphtheritic neuritis in man (Brouardel and Gilbert, "Maladies du cour et des Vaisseaux; Arterite chronique arterio-sclérose"; "Traite de Médecine," de Charcot, Bouchard, et Brissaud, vol. vi.; "Des artéritis aigues," vol. viii.), and endocarditis and phlebitis, synovitis and arthritis of strangles and pasteurellosis in the horse (Preus, "Relation d'une epizootie de pneumo-entérite infectieuse chez la jeune cheval," *Mem. et Obs. sur l'Hvg. et la Med. Vét. Mil.*, 2e S., 1899, page 20).

In the diseased tissues, after the lapse of a certain time, neither micro-organisms or toxins can be detected, only a degeneration of the tissues, and the arteritis of young subjects can be only due to prior infection. This localisation in the peripheric arteries of the extremities, which is well known in influenza and typhoid fever in the human being, is by certain authors looked upon as being due to deficient circulation in the limbs, and the insufficient supply of blood favours the production of arterial lesions.

The lesions of phlebitis are usually of the form described by Brun as latent or attenuated ("Phlébites infectieuses," "Traite de Méd," Charcot, Bouchard, and Brissaud, vol. viii.), which is accompanied by no visible symptoms, there being little or no pain and an entire absence of œdema; and if there are any, they are usually attributed to some other cause. The pathology of chronic phlebitis is but little

understood, but it is easy to see how any venous lesion will affect the general nutrition of the part, according to the amount and nature of the work. Nervous disorders in animals that have not been overworked may also be attributed to some prior disease of a serious nature.

Lesions of the Bones and Cartilages.—If the navicular bone is examined it presents all the appearances of osteomyelitis. The rarefied osteitis below the fibro-cartilage, which is secondarily implicated, can only be explained by localised infection, chronic from the outset, non-suppurative, and only occasionally roused into activity. The lesions in the fibro-cartilage are secondary to those of the bones, although in old-standing cases it is difficult to understand the slight extent to which the inflammatory process has spread. In order to settle this important point, navicular bones in the earlier stages of the disease have been carefully examined to decide which lesion is in the most advanced stage, by decalcifying them and making longitudinal sections where the cartilage was least altered. At these points the superficial fibro-cartilage is slightly diminished in thickness, forming a small erosion, which ultimately ulcerates, although the bony tissue underneath is seldom rarefied. At this point the Haversian canals are slightly enlarged and filled with a granular material, although the surrounding bone is dense and hard, and this is the case at each eroded spot. The alteration in the hard bone must be slower than in the cartilage, and it is only reasonable to suppose that it takes place first, as in tubercular arthritis, where the alteration in the cartilage is secondary.

The observations of Kiener and Poulet have shown that there is nothing specific in tubercular chondritis, and that the appearance of the cartilage in no way differs from inflammation resulting from an injury. Indeed, Koenig considers that there is no such thing as primary cartilaginous tuberculosis, and this theory is borne out by what is known of the nutrition of this tissue.

In some recent investigations by Broca, ulceration, erosion and primary necrosis of cartilage have been exhaustively studied, and he points out that the velvet-like tissue that is developed at the centre of the cartilage, and which has been described by Redfern, is due to infection of the subjacent bone, and that although the disease seems to originate in the soft structures of the joint, in reality the alterations first appear in the bone (Bouchard, Bordeaux, "Nouveaux elements de pathologie externe; arthrite séche deformante"). This point having been established, the changes in the navicular bone have next to be considered.

The bone and its medulla are both most susceptible structures, and in all general infections they participate, especially in the earlier stages, when they are very vascular. Also the important function that the skeleton fulfils up to 5 or 6 years of age should be remembered. In this process it is the medulla that plays the chief part, being affected to a greater degree than the bony tissue, and the pathological conditions should be considered as osteomyelitis rather than osteitis, or, more properly, infectious osteomyelitis (Mauclaire, "Maladies non traumatiques desos," "Traite de Chirurgie," de Le Dentu et Delbet, vol. ii.), as it can only be produced in two ways:—

(1) Directly, by open wounds or inflammation extending to the bone.

(2) Indirectly through the blood-vessels and lymphatics.

The first can be at once dismissed. The indirect channel presents itself to notice with all the greater force, as by systematic examination of a number of specimens it has been proved that the blood-vessels are affected with sclerosis.

In the human being certain forms of osteomyelitis develop very slowly, become chronic, and have no tendency to suppurate, so that although the condition may exist for years, it is not suspected (Gangolphe, "Maladies de os; conditions générales et locales qui president, au développement des maladies infectieuses et parasitaires des os"), and this latent form is started into activity by an injury, over-exertion of the joint, or any infection of the body. The development of these forms of chronic infectious osteo-arthritis has been studied by Dor (*Lyon Médical*, 1892-93), who has produced it experimentally in the rabbit.

In man, with certain forms of osteomyelitis, which cause no reaction in the neighbouring tissues, or suppuration, there are all the appearances of dry arthritis. This latter takes place in the navicular bone of the horse, which becomes necrosed, without the formation of sequestra, by defective nutrition.

Once osteomyelitis is established in the navicular bone, the fibro-cartilage on the lower surface quickly becomes implicated, as osteo-arthritis or osteosynovitis with progressive atrophy is commonly seen in short bones that have large articular surfaces like the astragalus and navicular. The fibro-cartilage on the lower surface of the navicular bone is particularly vulnerable, as there is considerable friction from the tendon, which passes over it like a pulley, and dry arthritis is set up, but there is never suppuration nor are sequestra formed.

The plantar aponeurosis of the tendon is also implicated with dry tenosynovitis; and in certain cases, although the bone is repaired, this condition of the tendon remains. The fibro-cartilage of the tendon exfoliates in the same manner as that of the navicular bone, giving rise to dry necrosis and chronic inflammation, which may extend upwards to the middle of the canon bone.

These lesions increase more or less rapidly, depending on a variety of causes, such as work, and it must be remembered that the vessels are implicated by the primary infection, being distinctly sclerotic, and the resulting defective nutrition causes increase of connective tissue at the expense of the tendon. The bones, fibro-cartilages, synovial membrane, and tendons are all implicated, and in reality the condition is one of dry tenosynovitis supervening on non-suppurative osteomyelitis.

The question has to be considered, why the navicular bone is more liable to chronic osteomyelitis than any other, and this is easily answered if the laws that govern the localisation of infectious diseases in the skeleton are remembered (Brault, "Arteritis and Sclerosis"). There is a coincidence between the importance of a bone and the frequency with which it becomes the subject of disease (Gangolphe), and M. Mauclaire points out that the degree of mobility is a considerable factor. "It is the most mobile bone, the one physiologically and pathologically the most liable to injury, that is most often affected."

It has been for a long time admitted that each time the foot comes to the ground a portion of the weight of the body is thrown on the

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"Crude molasses contains a considerable percentage of both soda and potash salts, and if given in large quantities **they have a noxious effect, giving rise to both bowel and kidney disturbances.**"

"Dr. J. Augustus Voelcker, M.A., B.C., Consulting Chemist to the Royal Agricultural Society of England, in his report on the Woburn Feeding Experiments with molasses, 1900-1901, to the Royal Agricultural Society of England, vol. lxii., p. 301, also states:—

"'There is, however, with its use (the use of Molasses), **a tendency to looseness in the animals,** which must be checked by not giving it in too great a quantity. One pound per day of Molasses among four bullocks was found to be about the limit.'"

"Sugar (molasses or molassed) foods **have the detrimental properties of molasses** in proportion to their contents of sugar."

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"In the form of Molassine Meal the humic product enters into combination with these salts, **neutralising them and rendering them inert, so that the danger of feeding on large quantities of crude molasses or sugar is avoided.**"

"It seems at once to fatten and harden the animal."

"There is little doubt that in a short space of time it will become, in spite of prejudice, the staple food of all classes of horses."

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"As a therapeutic agent **Molassine Meal undoubtedly has a healthy action on the bowels, aiding digestion** and keeping the patient free from worms."

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"In addition to its hygienic properties, which have been described, **it increases the secretion of milk,** also it regulates the digestive functions."

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"The fæces of animals fed on Molassine Meal are nearly odourless as compared with those of others that are getting ordinary food. **In pigs this is most evident, and is of considerable importance** when these animals are kept in towns or villages."

Extracts from an article in the "Veterinary Journal," May, 1905, by Colonel J. A. NUNN, F.R.C.V.S., F.R.S.E., D.S.O., C.I.E., Army Veterinary Department.

[SEE NEXT PAGE.

The Wonderful Merits of

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Mr. JUSTICE WARRINGTON, in giving JUDGMENT, said:—

"It was found that **molasses as a food for cattle could not be used safely,** though it had some very good effects, because of the existence in it of potash salts, which had a deleterious effect on the stomachs of the animals. The inventor said he got over the difficulty by using molasses in combination with peat, by which means he partially got rid of the salts, or converted them into non-deleterious substances. In his opinion, having heard the chemical evidence for this Company, the owners of the patent, he was satisfied that the statement in the specification that the **peat had a chemical effect on the molasses, which prevented it from being so deleterious,** was true.

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"Then he had the further evidence of Prof. McLauchlan Young, F.R.C.V.S., F.R.S.E., F.R.P.S., F.Z.S., who had made some experiments—not for the purposes of this trial—with various animals in Scotland during last year, and the result of those experiments is, that the food so compounded . . . **is very valuable as a nutritious food.**"

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navicular bone and plantar aponeurosis, especially when the frog does not come in contact with the ground; but, on the other hand, Ollier has pointed out the influence growing bone has on the extension of infectious diseases. "The areas of physiological proliferation are the favourite ones for pathological processes to develop in. The epiphysis is the last portion of the bone to be developed, and the last to unite to the shaft. It is the most vascular, and the part most subject to disease" (Gangolphe).

Even after ossification the epiphyses are more vulnerable than any other part of the bone, and M. Lesbre has shown that the sesamoids ossify after the epiphyses of the phalanges, and the navicular after these ("Contribution a l'etude de l'ossification du squelette des mammiferes domestiques"). This late ossification of the navicular bone, together with its liability to injury, explains why it is more likely than others to be affected in an attack of infectious disease, as it is not the only one subject to infection. It also is evident that, all things being equal, the younger the subject is the more likely the bone is to become diseased, and this danger is increased if the animal is set to work shortly after convalescence. Keen has made some observations on this fact, which seem to show that alterations in the bones is specially likely to take place in animals that are put to work too soon after recovery from influenza.

Osteomyelitis supervening on infantile complaints is not likely to attract attention, as it may be radically cured; or, take the latent form, which in its turn may be roused into activity by any exciting cause, such as cold, injury, overwork, or any infectious disease, and therefore it may be a sequel to a variety of causes. Although the first active appearance of the disease may not take place until a long period after the primary cause, during which time the animal has enjoyed apparently perfect health, all the same, it continues to exist in a latent form.

Chantemesse and Buschk state as an extreme case that they have seen the typhoid bacillus from two and a half to seven years in the system after the attack, and aroused into activity by some extraneous influence.

The pathogenic microbe of the disease during the course of which the osteomyelitis makes its appearance is not invariably the cause of the lesion, which is merely induced by the secondary infection attacking the most predisposed part ("Locus minoris resistantive") and medullary congestion and osteomyelitis has been recognised as a sequel of influenza in patients of all ages (Dechambre's "Dictionary," article "Osteomyelitis").

To recapitulate, it appears that a severe primary affection attacking a young animal will leave permanent inflammatory traces (1) in the peripheric nerves and vessels; (2) in the joints; (3) in the medulla of the navicular bone, and sometimes in other portions of the skeleton, and then chronic lesions depending on their intensity and the life of the patient, "such as the work he is called upon to perform," either improve, remain stationary, or increase separately or simultaneously. The symptoms may also run into one another, complicating, not only the case, but the diagnosis.

In these notes all hereditary and congenital causes have been left out of consideration, but it is evident that if physical overwork, such

as the training of racehorses, and acute diseases such as strangles and rheumatism, can give rise to disastrous effects in a healthy organism, that the results will be much more marked in one already predisposed by hereditary disease. The same causes give rise to dry tenosynovitis in man, which is sometimes termed "professional." It is seen in persons who write a great deal, laundresses, pianists, fencing masters, carpenters, porters, reapers, and gymnasts, and, as a result of long marches, in soldiers ("Synovite crepitante," "Traite de Chirurgie," de Duplay et Reclus, vol. i.)

Arthritic subjects are predisposed, and this accounts for the recurrence and symmetry of the disease. In the human being, if the part is rested, the symptoms do not, as a rule, increase, indeed, they usually disappear in a few days, but are likely to return with over-exertion of the part.

The dry tenosynovitis of the navicular joint can, with all fairness, be considered as "professional" in the horse, and navicular disease in reality is only a symptom of chronic non-suppurative infectious osteomyelitis, accompanied by dry tenosynovitis, in the limb affected with vasculo-sclerosis, and attacking an animal that is predisposed to congenital or acquired arthritis.

Heredity of Navicular Disease.—It is not easy to answer the question as to whether navicular disease is hereditary or not. Numerous authors have attempted to solve the question, but without result, or they are not able to bring forward any convincing facts. As a fact, the medical history of both ascendants and descendants is obscure in human beings, and in animals it is almost impossible to follow up. This in the case of navicular disease is further complicated by the fact that an absolutely certain means of diagnosis remains yet to be discovered.

In this dilemma, the following means of deduction have been adopted: (1) To establish anatomically, pathologically, and clinically the relationship between navicular disease in the horse and some other disease in the human body. (2) The results being identical, if it can be proved to be hereditary in man, it may also be reasonably supposed to be so in the horse, and as we have seen clinically, navicular disease in every way resembles dry anthritis.

The pathological conditions also show: (1) The polyarticular lesions are the same as those of chronic rheumatism or dry arthritis, both hereditary diseases in man; also osteomyelitis and dry tenosynovitis. (2) The sclerosis of the vessels and peripheric nerves, all of which are degenerative changes depending on the arthritic predisposition, and all the lesions seen in navicular disease, the osteomyelitis, the dry tenosynovitis, and the vasculo-neuro-sclerosis, are all traceable to the same source. Man, however, in the earlier stages will rest himself, but the horse has to continue to work.

If sires that are capable of performing a certain amount of work are dangerous for breeding purposes, much more so is the dam if she has navicular disease. Such parents transmit to their stock a predisposition to arthritis, which only requires some exciting cause to rouse it into activity.

It is therefore absolutely necessary to reject all animals, both stallions and mares, for breeding purposes that show the slightest signs of navicular disease.

(*Revue Générale de Médecine Vétérinaire.*)

THORACIC TUBERCULOSIS WITH PSEUDO-PERICARDITIS IN A COW.

BY LIENAUX.

THE patient, "a heifer," was brought to the author in very poor condition. The respiration was quick, she had a dry cough, but no discharge from the nose, dulness at the lower part of the thorax (less marked on the right than the left side), moist râles, and bronchial murmurs. The heart's impulses were absent on the left, but well marked on the right side. The jugular veins were enlarged, but there was no œdema. The pre-scapular glands on the right side were enlarged, also one of the mammary group. There was continued fever, but no reaction to tuberculosis.

The bilateral enlargement, jugular engorgement, and the heart sounds to the right, pointed to the existence of pericarditis, the heart being displaced to the right by some lesions, probably of tubercular origin, on the left of the pericardium. There were hydatid cysts and abscesses in the lungs and mediastinum which accounted for the dulness on auscultation. There were tubercular nodules on both the pulmonary and costal pleura on the left side, with adhesions of the pericardial sac on the right side. The heart was atrophied.

The diagnosis of tubercular pericarditis in the ox is exceedingly difficult. It is always of the dry form, and as the pericardium is not thickened, and the contents are more or less solid, the heart's sounds and impulse are exaggerated and confused.

(*Annales de Médecine Vétérinaire.*)

A QUAINT RECIPE.

THE following from an old book is given as "an excellent cure for the murrain in cattel": Take for every beast a quart of old wash and a good quantity of hens' dung, and lay the latter to steep eight or ten hours, and then strain the dung forth, and break to every beast two rotten eggs into the fore-named juice; and give to everyone two pennyworth of spikward, and blend all these together and give it the beast; but first let blood, both sick and sound, and separate the sick from the sound. Drench both horses and swine, for they are both apt to take the disease. Bury the dead deep in the ground, so that dogs cannot get at the carcase.

(*Farm amd Home.*)

INDICATIONS OF, AND RESULTS OF, NEURECTOMY IN THE HORSE.

BY PEUCH.

THE author gives a long series of observations regarding plantar, median, sciatic, tibial, and tibio-sciatic neurectomy.

Plantar neurectomy is indicated in cases of side and ring bone being double in navicular disease.

Median neurectomy is indicated in old-standing navicular disease, ring bone, carpal and metacarpal osteitis, chronic tendonitis and sesamoiditis.

Sciatic and anterior tibial in cases of bone spavin.

The bad results can usually be traced to infection, or the practice of putting on a hot shoe and burning the foot. This practice should be forbidden and particular attention paid to driving the nails.

(*Journal de Médecine Vétérinaire et de Zootechnie.*)

THE OPHTHALMOSCOPE IN VETERINARY PRACTICE.

BY ABLAIRE.

THE author points out that on a dull day the direct sun's rays reflected from the mirror give uncertain or negative results, not being sufficient to illuminate the eye.

On the contrary, when reflected from a white wall, the sun's rays are an excellent light for the ophthalmoscope, but not for the keratoscope.

The bright moonlight is excellent for this purpose, and the author recommends it for beginners, as the surroundings of the eye are in the dark, and confusion caused by shadows avoided.

On an ordinary day direct light can be used if both the observed and observer are in the shade, but the observer should face the sun. The handle of the ophthalmoscope should be held horizontally, with the mirror facing slightly upwards, so that the rays coming from above may be collected.

For the keratoscope artificial light in a dark box is the most satisfactory.

(*Recueil d'Hygiene et de Médecine Vétérinaires Militaires.*)

USE OF LUSOFORM.

BY DR. A. LOIR.

"IN many cases formalin is superior to bichloride of mercury, as it does not damage instruments, &c., and is not poisonous." It, however, gives off irritating fumes, which renders it objectionable.

Lusoform has all the advantages of formalin, without any of its drawbacks. It contains 20 per cent. formalin in combination with soap, forming a staple compound, and removing its irritant properties. Lusoform does not coagulate albumen, and its alkaline reaction favours the bactericidal action of the formaldehyde.

Symanski (*Zeitschrift für Hygiene*, 1901, No. 37), comparing the action of different antiseptics, finds that lusoform is fully up to the standard of those known, and is particularly active on the spores of anthrax.

According to Dr. Loir, lusoform in a 2 per cent. solution destroys the *Bacterium coli* in ten minutes; and the tuberculosis bacillus in less than three days with a 1 per cent. solution.

Scydewitz (*Centralbl. für Bakt.*, 1902, No. 3) has destroyed anthrax spores in less than three weeks with a 1 in 1,500 solution, also the cholera bacillus with the same solution.

Galli Valerio (*Archives Générales de Médecine*, 1903, No. 46) used weak solutions in the treatment of peritonitis.

Nazelschmidt (*Therap. Monatshefta*, 1902, No. 91; 1903, No. 2) gave a goat 135 grammes without any ill-effects. The toxic dose per kilo live weight in the rabbit is 0·015 grammes corrosive sublimate, 0·268 to 0·348 grammes carbolic acid, and 5·15 to 7 grammes of lusoform.

Peyton Beale (*Medical Press*, January, 1903) recommends lusoform in suppurating arthritis for the irrigation of abscess and treatment of boils.

Professor Duhrssen (*Vade-mecum d'Obstetrique*, 1902-1903) recommends its use in retention of the placenta on account of its rapid deodorising properties, also in vaginitis, metritis, and for the disinfection of the skin, hands, instruments, and dressings.

Regnier (*Progrès Médicale*, 1904, No. 4) uses it as a mouth-wash and gargle in scarlatina and diphtheria, "one teaspoonful to three quarts of water," and finds it well tolerated. Two teaspoonfuls to a quart of water give a 1 per cent. solution.

It is particularly applicable for the disinfection of instruments; nickel and silver can remain for a month in a 3 per cent. solution without injury, and both vulcanised and soft indiarubber for three months (Galli Valerio).

A 1 per cent. solution is sufficient for the disinfection of the hands and person; it will stop putrefaction in putrid urine, and is a rapid disinfectant and deodoriser.

For washing down floors and buildings a 2 to 3 per cent. solution is sufficient; it does not discolour paint or injure fabrics.

(*Presse Médicale.*)

BILATERAL RUPTURE OF THE MUSCLES OF THE HIND LIMBS IN A COW.

PROFESSOR KROULIKOWSKY, LEMBURG.

THE patient, a five-year-old cow, was found down in the morning and unable to get up. On examination, the Achilles tendons on both sides were flaccid, and the under portion of the thighs smaller and painful. The skin was intact, but on palpation it was found that the gastrocnemic muscles were ruptured in the middle, the ends being several inches apart.

With great difficulty the animal got up on her fore legs like a dog, but was unable to raise her hind legs, which from the back downwards remained in contact with the ground. She remained in this position for a few minutes, but was in great pain, and as the case was hopeless she was slaughtered. On the right side the muscles

were ruptured right across at the middle third of the tibia. The head of the plantar muscle was alone ruptured posteriorly, and the upper portion of the biceps femoralis for several inches across. The tibial artery and nerve were intact, but the connective tissue was full of coagulated blood. The same condition was seen in the left limb.

Rupture of the gastrocnemic tendons is not unknown in oxen, but a double rupture of the muscular portion is most exceptional. How the accident took place is not known, but in all probabillity through the legs slipping forward when the cow was in the act of rising.

M. Moussu ("Double rupture des muscles, Jumeaux," *Revue Générale*, April 1, 1905, vol. v., page 384) reported a similar accident in an eighteen-months-old heifer through tumbling into a ditch, but in this case the injury was limited to the gastrocnemic muscles.

(*Przeglad Weterinarsky.*)

PROGRESSIVE BULBAR PARALYSIS IN THE OX.

DR. DODERLEIE, GONZENHAUSAN.

Outbreaks of enzoötic disease in cattle attributed to poisoning by a fungus in grain (*Tillatia caries*) have been described from time to time. In France the disease is popularly known as "Maladie de l'equarrineur," and in Germany as "Wasenmeister krankheit."

In 1904 the author saw several cases of gastro-enteritis much resembling the previously reported disease, complicated with bulbar paralysis. The first case occurred on March 17, in a cow that had hardly eaten anything for the past two days. There was another cow and a bull-calf in the same stable. The sick animal's temperature was 38·9 cent., the buccal mucous membrane was red and congested, the jaws were moved with difficulty, and a quantity of half-masticated food was lodged under the tongue and between the teeth and cheeks; there was inability to swallow, and difficulty in moving the tongue. The bowels were normal, but there was polyuria. There was an almost continuous twitching of the muscles of the hind quarters.

A purgative and intravenous injection of collargol were given, but without result. The patient gradually got worse, and on the tenth day the jaws, tongue, and pharynx were completely paralysed. The case appearing hopeless, the animal was slaughtered.

On *post-mortem* examination there were a number of hæmorrhagic patches seen on the abomasum, but the mucous membrane was not œdematous.

On March 27 the second cow was attacked, but the owner having sold her a few days afterwards, she was lost sight of. The calf remained healthy.

The forage appeared to be sound without any trace of mould on it.

(*Wochenschrift für Tierheilkunde.*)

INFLAMMATION OF THE PANCREAS.

SCHOTTLER (OBERNDORF).

In making an examination of the body of a horse the author found the following lesions: There was an iron wire a foot long by one-sixteenth of an inch thick in the duodenum, the mucous membrane of which had been injured by the ends, and which were covered with abrasions. A blood clot existed on the middle lobe of the pancreas, and there were a number of small abscesses between the serum and muscular coats of the colon. There was interlobular cirrhosis of the liver, with fatty degeneration of the renal epithelium; the spleen being greatly enlarged, hard, and of a dark blue colour. Death took place from infection supervening on the injuries to the small pancreatic vessels by the wire.

The only symptoms noticed during life was a bad appetite, weakness, and occasional moaning, but no colic.

(*Deutsche tierärztliche Wochenschrift.*)

TWO CASES OF SUDDEN DEATH FROM ENGORGEMENT OF THE STOMACH.

N. BENJAMIN.

The patients were two mares that were sent by train from Mans to Paris, and were nearly twenty-four hours on the journey. On their arrival they were given a feed of hay and bran. They both died six hours after showing the following symptoms: The first animal was quite comatose, and moved with difficulty, blowing, and the pulse small and thready; the conjunctiva injected. She was bled, about four quarts being taken, the blood being very dark in colour. In the second animal there was profuse diarrhœa; she died in an hour. On *post-mortem* examination there was found to be great congestion of all the abdominal vessels, and the stomach to be enormously distended. The author is of opinion that in both cases the stomach was paralysed, and the arterial pressure was so great that it killed the animals.

(*Recueil de Médecine Vétérinaire.*)

TRACTION OF THE TONGUE IN DYSPNŒA.

NAIN.

The patient was suddenly attacked with acute dyspnœa, the respirations being blowing, with a loud, roaring sound. The nostrils were dilated, eyes staring. Conjunctiva injected, and the pulse small and weak. The roaring was laryngeal in origin and on inspiration. The gutteral region was painful, with a harsh, deep, spasmodic cough. The tongue was drawn out to examine the mouth, when the noise at once ceased, but when let go it recommenced. This was repeated, and in a short time the animal was completely relieved.

(*Recueil de Médecine Vétérinaire.*)

Books and Periodicals, &c., Received.

Anatomical Diagrams of the Ewe (H. C. Wilkie); The Creamery Journal; Department of Agriculture (Ireland); Journal of the Board of Agriculture; Cape Colony Agricultural Journal; Journal of the Royal Army Medical Corps; The Tropical Agriculturist of Ceylon; American Veterinary Review; Twenty-first Annual Report of the Bureau of Animal Industry; Recueil de Médecine Vétérinaire; Clinica Vétérinaria; Le Bulletin Vétérinaire.

Letters and Communications, &c.

Mr. H. B. Eve; Prof. Dunstan; Major Pease; Capt. Cochrane; Mr. Woodward; Mr. Elphick; Mr. W. Robertson; Prof. Bradley; Mr. Steele; Mr. Linton; Prof. Wooldridge; Prof. O'Connor.

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